

QST

March, 1952

40 Cents

45c in Canada

devoted entirely to

amateur radio



0612

TWENTY METERS OPENS TO THE EAST . . . SEE PAGE 31

PERMALLOY DUST TOROIDS FOR MAXIMUM STABILITY...

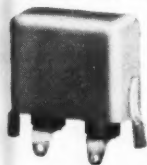
The UTC type HQ permalloy dust toroids are ideal for all audio, carrier and supersonic applications. HQA coils have Q over 100 at 5,000 cycles...HQB coils, Q over 200 at 4,000 cycles...HQC coils, Q over 200 at 30 KC...HQD coils, Q over 200 at 60 KC...HQE (miniature) coils, Q over 120 at 10 KC. The toroid dust core provides very low hum pickup...excellent stability with voltage change...negligible inductance change with temperature, etc. Precision adjusted to 1% tolerance. Hermetically sealed.



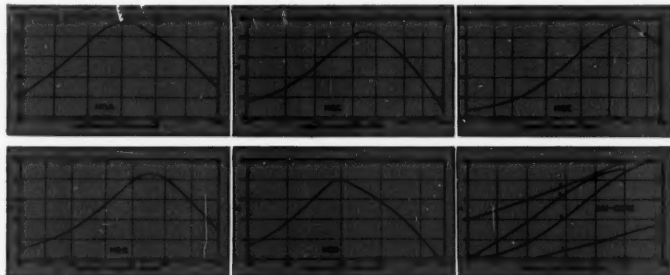
HQA, HQC, HQD CASE
1 13/16" Dia. x 1 3/16" High



HQB CASE
1 5/8" x 2 5/8" x 2 1/2" High

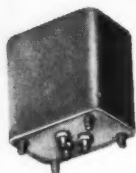


HQE CASE
1 1/2" x 1 5/16" x 1 3/16" High

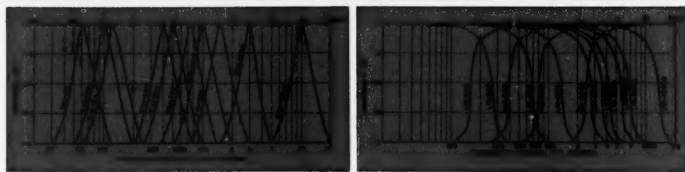


Type No.	Inductance Value	Net Price	Type No.	Inductance Value	Net Price	Type No.	Inductance Value	Net Price
HQA-1	5 mhy.	\$7.00	HQA-16	7.5 hy.	\$15.00	HQC-1	1 mhy.	\$13.00
HQA-2	12.5 mhy.	7.00	HQA-17	10. hy.	16.00	HQC-2	2.5 mhy.	13.00
HQA-3	20 mhy.	7.50	HQA-18	15. hy.	17.00	HQC-3	5 mhy.	13.00
HQA-4	30 mhy.	7.50	HQB-1	10 mhy.	16.00	HQC-4	10 mhy.	13.00
HQA-5	50 mhy.	8.00	HQB-2	30 mhy.	16.00	HQC-5	20 mhy.	13.00
HQA-6	80 mhy.	8.00	HQB-3	70 mhy.	16.00	HQD-1	.4 mhy.	15.00
HQA-7	125 mhy.	9.00	HQB-4	120 mhy.	17.00	HQD-2	1 mhy.	15.00
HQA-8	200 mhy.	9.00	HQB-5	5 hy.	17.00	HQD-3	2.5 mhy.	15.00
HQA-9	300 mhy.	10.00	HQB-6	1. hy.	18.00	HQD-4	5 mhy.	15.00
HQA-10	.5 hy.	10.00	HQB-7	2. hy.	19.00	HQD-5	15 mhy.	15.00
HQA-11	.75 hy.	10.00	HQB-8	3.5 hy.	20.00	HQE-1	5 mhy.	6.00
HQA-12	1.25 hy.	11.00	HQB-9	7.5 hy.	21.00	HQE-2	10 mhy.	6.00
HQA-13	2. hy.	11.00	HQB-10	12. hy.	22.00	HQE-3	50 mhy.	7.00
HQA-14	3. hy.	13.00	HQB-11	18. hy.	23.00	HQE-4	100 mhy.	7.50
HQA-15	5 hy.	14.00	HQB-12	25. hy.	24.00	HQE-5	200 mhy.	8.00

UTC INTERSTAGE AND LINE FILTERS



FILTER CASE M
1 3/16 x 1 11/16,
1 5/8 x 2 1/2 High



These U.T.C. stock units take care of most common filter applications. The interstage filters, BMI (band pass), HMI (high pass), and LMI (low pass), have a nominal impedance at 10,000 ohms. The line filters, BML (band pass), HML (high pass), and LML (low pass), are intended for use in 500/600 ohm circuits. All units are shielded for low pickup (150 mv/gauss) and are hermetically sealed.

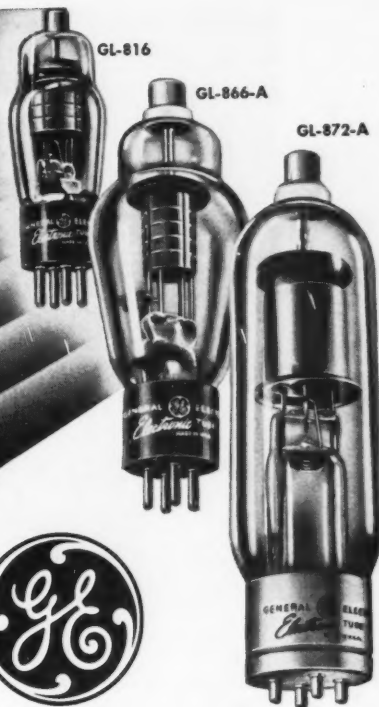
STOCK FREQUENCIES (Number after letters is frequency) Net Price \$25.00

BMI-50	BMI-1500	LMI-200	BML-400
BMI-100	BMI-3000	LMI-500	BML-1000
BMI-120	BMI-10000	LMI-1000	BML-200
BMI-400	HMI-200	LMI-2000	BML-500
BMI-500	HMI-500	LMI-3000	LML-1000
BMI-750	HMI-1000	LMI-10000	LML-2500
BMI-1000	HMI-3000		LML-4000
			LML-12000

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that can take it—**

**STEP UP
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CAPACITY!**



● **Plenty of safety factor** in your power supply means longer rectifier life—by a big economy margin! The three G-E mercury-vapor stalwarts shown here will save you tube-replacement money, save you broken-off rag-chews. In this way . . .

Are you handicapped by a small full-wave rectifier—say, a 5Y3-GT or 5R4-GY—that won't let you shove in the link as far as you'd like? Then change to a pair of GL-816's (extra cost is so little as to make no difference). They can handle up to 350 w of transmitter input.

Still more power? Plug in a pair of GL-866-A's, which will supply a kilowatt final and its driver. Like the GL-816's, these tubes will last and last, because their capacity is ample for their job.

Real heavy-duty rectifier wanted? Two GL-872-A's will deliver 2.5 amp at 3,180 v—8 kw—*typical operation*. That's a lot more power than you'll ever need . . . so your 872-A's will be just loafing, even with your rig full-throttle.

See your G-E tube distributor . . . today . . . for further facts about these money-saving, trouble-saving rectifier tubes for hams! *Electronics Division, General Electric Co., Schenectady 5, New York.*



G-E MILESTONE:



RECTIFIER TUBES
for radio—
high-vacuum and
mercury-vapor.



● Starting with the fundamental work of Dr. Irving Langmuir, who in 1913 originated the high-vacuum, high-voltage tube, General Electric's research in rectifier types has been preeminent. G. E. announced the first rectifier tube for radio receivers in 1925. Hot-cathode mercury-vapor rectifier tubes were announced in 1928. Specific-type pioneering includes, among many popular tubes, two of the three that are shown here: GL-866-A and GL-872-A. General Electric "firsts" like these stand for superior design experience—perfected manufacturing technique—**QUALITY** in G-E rectifier tubes you buy and install!

ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

GENERAL  **ELECTRIC**

166-183



Everything's under control with the Collins 32V-3

WHETHER you want to operate phone or pound brass, rag-chew, handle traffic, work DX or meet a round table date, the 32V-3 gives you everything yet devised for successful transmissions over the crowded ham lanes.

With this bandswitching, gang-tuned rig you flip from band to band in no time flat. And only the band you're in is lighted on the slide rule dial. This dial roughly indicates operating frequency, while the vernier dial provides a direct, accurate reading in kilocycles.

The stable, thoroughly engineered Collins 70E-8A permeability tuned oscillator is used as the VFO. When the 32V-3 is tuned it stays put.

And wallop? This compact, receiver-size transmitter has the kick of a kangaroo. While rated at 150 watts input on c-w, 120 watts phone, it is often reported as coming in like a kilowatt. It's a well proved DXer.

All controls are conveniently located on the front panel. The 32V-3 can be operated by a push-to-talk switch on microphone or key, or by separate switch.

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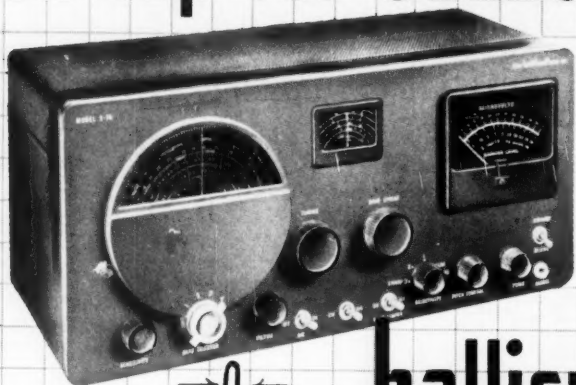
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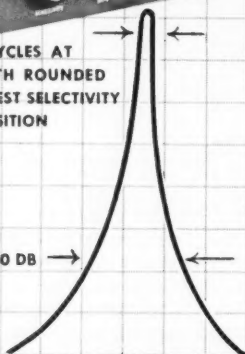
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R-46 SPEAKER—New 10" PM in matching satin black cabinet with 500-ohm transformer **\$19⁷⁵**



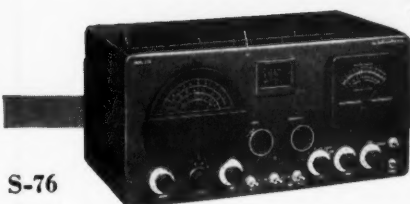
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Remember, everyone who completes the course wins! The first ten Novices who complete the following will receive, absolutely FREE, a Hallicrafters S-76 Receiver. All of the other Novices who complete will receive \$25 in cash, each.

1 HALLICRAFTERS Merit Awards will be given to every Novice who, during the period beginning 12:01 A. M., September 8, 1951, and ending 12:00 P. M. September 7, 1952, (local time) works all states and has obtained by September 7, 1952, a General or Conditional Class Amateur License. Both Novice-Class and "regular" QSOs can be used to make up the total of 48 contacts.

2 Rules governing contacts and verifications thereof are the same as for ARRL W. A. S. Certificates (see page 6, "Operating an Amateur Station"). Your package of verifications must be postmarked not later than October 7, 1952.



Thanks to all of you who have already dropped us a line that you are "working all states" for the 1951-1952 Merit Awards. We would like to know the names of everyone who is competing —so we can publish later a list of calls, names and addresses of those in the running. This list will help you in your contacts.

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Bill Halligan, Jr. WN90EP

The HALLICRAFTERS Company, Chicago 24, Ill.

Dear Bill: I've started working on my W.A.S. Certificate.
Have contacted states so far. ☐

MY CALL DATE OF
..... LICENSE

NAME

STREET

CITY ZONE STATE

QST

Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (or preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio Club reports are also desired by SCMs for inclusion in **OST, All ARRL Field Organization** appointments are now available to League members. These include ORS, OES, OPS, OO and OBS. Also, where vacancies exist SCMs desire applications for SEC, EC, RM, and PAM. In addition to station and leadership appointments for Members, *all amateurs* in the United States and Canada are invited to join the Amateur Radio Emergency Corps (ask for Form 7).

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THE AMERICAN RADIO RELAY LEAGUE, INC.,

is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the administrative headquarters at West Hartford, Connecticut.



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"It Seems to Us..."



21 MEGACYCLES—ON THE WAY AT LAST

About this time each year, during the past three years, we have had an editorial to comment on the recurrent question "When do we get the 21-Mc band?" The gist of all preceding jobs has been that we couldn't even hazard a guess. This, the 1952 version, will strike a more hopeful note.

Newer hams may want to know what this is all about. It refers to some changes in our frequency bands that will take place when the provisions of an international radio treaty written at Atlantic City in 1947 come into effect. Under its terms, we amateurs acquire an entirely new 450-ke. band, from 21,000–21,450 ke., and lose 50 ke. from the top of the present 14-Mc band, so it will be 14,000–14,350 ke. (These are the only changes affecting amateurs in the Americas; amateurs elsewhere will have additional changes, principally a loss of operating privileges in part of the 7-Mc band.) However, none of this has yet taken place. The reason is that the Atlantic City frequency table below 27.5 Mc. isn't in effect yet, having been delayed by a host of practical operating difficulties. So the question at the start of this piece is, in reality, a question of when the Atlantic City allocations come into force.

Until now the only answer has been that we didn't know because no internationally-agreed plan for making the changeover from the present allocations to Atlantic City had been worked out, not only for amateurs but for all services. It is this situation which has now changed; a plan *has* been worked out recently, and the business of putting Atlantic City into force will begin very shortly.

Remember references in *QST* last autumn to League attendance at a conference in Geneva? This is, mainly, what that conference was all about. When it wound up in early December it had produced a plan which, it is hoped, will do the job; all the countries concerned are now back home hard at work to get the plan under way.

Of course, there has to be a catch. That catch is that the Geneva Plan doesn't spell out a simple time-table by which first this portion and then that portion of the Atlantic City spectrum will come into force. Everyone wishes life in the radio spectrum were that

easy; unfortunately, it is not. We still can't pin-point a date. At this stage, we can say only that at last after nearly five years, we're definitely started on our way.

Why we cannot pin-point a date is easily explained. The Geneva Plan provides for an involved step-by-step procedure that, as now contemplated, will be completed sometime after early 1955. Between now and then there will be a slow conversion, a piece-work process, on a voluntary basis, from the old allocations table to the new.

Don't let that "voluntary" discourage you; it's simply a way of getting around commitments on dates that no one at Geneva was in a position to make. All have pledged themselves to work hard at conversion to the new spectrum. However, we do want to emphasize that many of the initial changeovers will be individually by countries, each bringing its own affairs in order as it can; at times, however, frequencies will be changed over from the old to the new by agreement between two or more countries. At some point in this process, our government will be able to make available to us the 21-Mc band (not necessarily all at once) and at some point it will find it necessary to change our regulations to cut off those 50 ke. at 14 Mc. Other countries will be doing the same in the case of their amateurs — some sooner than we, conceivably; others simultaneously with us; others, perhaps, not until later.

This is the subject now occupying a large part of our attention and time, as it will continue to do until our changes under Atlantic City have been effected. Sooner or later you'll see the results in appropriate proposals by FCC to change our regulations with respect to the frequencies involved. It may be quite soon — and, of course, that's what we'd prefer; in its entirety, however, it could cover a space of years. But we're on the way.

We'll keep you posted.

THE EXTRA CLASS EXAM

At the year's end FCC made public the list of paraphrased study questions for the Amateur Extra Class examination. The list is comprehensive, containing 279 questions covering practically all phases of radio in which amateurs may be expected to be active. FCC itself has not the means to give the study guide

general distribution, but ARRL's *License Manual* is now being revised to include it and a new edition will be available about the time this issue of *QST* reaches you. Before seeing the list we had intended printing the questions in *QST*, but it has turned out to be so extensive that it would be impracticable to print questions and answers, *License Manual* style, without stringing it out over a period of five or six months.

We note some interesting things about the questions. Forty-nine of them have been taken intact from the present Advanced Class examination. Another ten are questions on amateur regulations. Of the remainder, some 140 are from commercial examination elements, principally Basic Radiotelephone, Advanced Radiotelephone, and Advanced Radiotelegraph; they appear either exactly as in those examinations or with slight rewording to make them more suitable for an amateur examination. The subjects covered are of course non-specialized — i.e., questions dealing with equipment, techniques and regulations peculiar to broadcast and commercial communication are not included — but constitute pretty thorough coverage of the general radio principles included in the commercial exams. The remaining 80-odd questions are new ones covering radiotelephony, antennas and transmission lines, single sideband, TVI, microwaves, and propagation.

It is fair to say, we believe, that the amateur who has earned his Extra Class license by passing this examination has demonstrated to FCC that he is on a par, at least so far as a broad knowledge of radio technicalities goes, with the best of his commercial brethren. In some phases he has to be better informed. Where, for example, is the commercial ticket holder who has had to show knowledge of single-sideband techniques? You can display this license with every bit as much pride as you would the first-class commercials.

RESOURCEFULNESS

Amateurs as a whole are a resourceful group. Time and again in difficult situations, whether it be substituting parts in a new rig or doing yeoman service in a communications emergency, the individual amateur radio operator has proved that the skill and knowledge gained from the pursuit of his hobby stands him in good stead. It did to Captain Henrik Kurt Carlsen, W2ZXM, who, as told elsewhere in this issue, put his amateur ingenuity to work in the very best amateur tradition to enable him to maintain communications from his badly damaged ship, the *Flying Enterprise*.

You can pick up a lot of practical knowledge in this game. Sometimes it can really mean a lot.

You never can tell. . . .

FEED-BACK

In Fig. 3A of "A Civil Defense Control-Station Antenna for 144 Mc.," November 1951 *QST*, the top metal ring should be $\frac{1}{4}$ inch thick, not $1\frac{1}{4}$ inches as labeled.

The value of R_7 , Fig. 2, of "A Simplified Electronic Break-In System," December 1951 *QST*, was inadvertently omitted. It should be 100,000 ohms, 1 watt.

In the article, "A Complete Portable 40-Meter C.W. Station," by W9FKC, which appears in the December issue, the power-supply circuit of Fig. 2, page 13, is in error. Pin 5 of the power connector should go to the negative side of C_2 , instead of C_3 . R_1 should go to the first rectifier and to the negative side of C_3 . The lower side of the a.c. line should connect *only* to Pin 1 of the power connector and to one side of transformer T_1 .

W1FWH has called our attention to the omission of an r.e. combination in the circuit of "Three Channels on Ten," January 1952 *QST*. A 4700-ohm 1-watt resistor and a 0.006- μ f. 1600-volt capacitor should be connected in series across the high-voltage secondary winding of transformer T_3 .

Quist Quiz

A lives $\frac{1}{4}$ mile from **B** and claims that **B**'s 40-meter c.w. rig is clean as a whistle at low power (30 watts) but roughens up and has several spurious signals when the power is increased to a kilowatt, not to mention the key clicks that can be heard over most of the band. **B** says that the trouble might be in **A**'s receiver. With real estate at the present prices, what is the solution?

(Please turn to page 110 for the answer)

HAMFEST CALENDAR

OHIO — Saturday, March 22nd, at the Biltmore Hotel, Dayton — first annual "Ham-vention," sponsored by the Dayton Amateur Radio Association. The program includes Phil Rand, W1DBM, and By Goodman, W1DX, with all the best features of both hamfests and conventions being included in the day's activities. There will be special entertainment for the gals. Tickets (including the dinner) are \$4.00, and there's plenty of hotel space for those wanting to make a week end of it. Make all reservations with Chairman John Willig, W8ACE, 98 Canterbury Drive, Dayton, Ohio.

Instantaneous Prediction of Radio Transmission Paths

Results of a Test of Scatter-Sounding Techniques on Amateur Frequencies

BY OSWALD G. VILLARD, JR.,* W6QYT, AND ALLEN M. PETERSON,** W6POH

IN the twenty-four hours following 1 P.M. PST on 14 December, 1951, approximately 320 fourteen-megacycle 'phone stations throughout the United States participated (although their participation was unknown to them) in a test at Stanford University of what may prove to be an important new technique for predicting and verifying skywave radio transmission. During each five-minute interval for substantially the entire period, a log was made of the 8-meter readings of all stations which could be positively identified. This information was then compared with a series of photographic records taken with the aid of modified amateur transmitting equipment and representing, if the present belief is correct, a plot of distance to the edge of the skip zone *versus* azimuth. Since radio transmission will be strongest when the distant station is at the edge of the skip zone or somewhat beyond, and since this skip zone varies with direction and time of day, the object of the test was to see whether the strongest amateur signals at any given time actually do come from the neighborhood of the zone outlined in the photographs.

This technique, called "scatter sounding," represents a method for determining the geographical areas to which strong transmission may be maintained at any given time and frequency. Should it prove reliable, its usefulness in both

• QST is proud to present in this article a description of an experiment, conceived and performed by amateurs, that represents not only a useful scientific contribution but also confirms a technique that has immediate applications in practical communication. By using the method discussed here it is possible to determine whether or not a band is "open" in a given direction, and to what distance if so, using familiar equipment with relatively simple modifications. The determination can be made entirely at the transmitter, and does not depend on other stations being "on the air."

tion at a given frequency to any location within a radius of several thousand miles will be strong, weak or out of the question. By an extension of the technique, it should be possible not only to establish exactly the correct frequency for best transmission to a particular locality, but also to monitor the variations of this frequency from minute to minute throughout the 24 hours.

The test described in this article was undertaken to check scatter soundings at a number of different distances to the skip zone (as a particular band opens in the morning, and goes out again at night), and in a number of different directions. It is a test of crucial importance, and one which can only be carried out with the aid of amateurs. How it was accomplished is set forth below.

Scattering Mechanism

Scatter sounding, in briefest outline, consists of noting the time delay between the transmission of a radio signal and the return of a small fraction of its energy scattered back to the transmitter

when the outgoing signal strikes irregularities on the surface of the earth. Fig. 1 is a simplified diagram showing how this scattering occurs.

The ionosphere — a fairly homogenous gassy region, acted upon by solar radiation — seems to reflect radio waves as efficiently as a highly polished mirror reflects a flashlight's beam. The

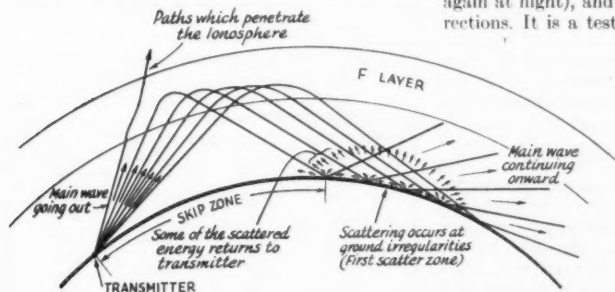


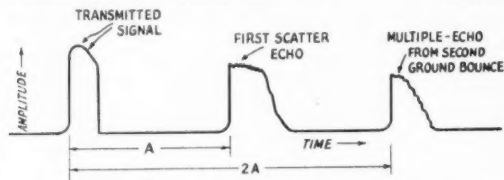
Fig. 1 — Some of the radio energy going out from a transmitter is scattered back by irregularities at the surface of the earth.

commercial and amateur communication will be very great. For the first time, it will be possible to state definitely (following a test of perhaps one minute's duration) whether two-way communica-

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earth, on the other hand, is a less satisfactory reflector in this respect. The comparison is similar to the relative efficiency of a good mirror and a bright — but not polished — piece of metal in reflecting a sharp beam of light. If a man holding a spotlight stands in a darkened room and points it obliquely at a mirror, the beam will be reflected without noticeable loss of brightness and the man will have difficulty in seeing the mirror itself. If bright metal is now substituted for the mirror, the beam will still be reflected, but the reflected part will be appreciably weaker. The place where the beam strikes the metal will glow brightly, and the metal can be easily seen; this is light being scattered back to the observer.



A: Approximate time interval required for round-trip wave travel between transmitter and first scatter zone

Fig. 2 — Scattered energy produces an echo when the transmitter is keyed: from the echo time delay, distance along the ground from transmitter to echo source can be calculated.

The back-reflected energy produces an echo at the transmitter whose time delay is measured as in radar. A drawing of a typical oscilloscope indication (amplitude-time, or "A scope") is shown in Fig. 2. From the time delay shown (the interval A), the ground distance from transmitter to scatter source may be calculated. Fig. 3 shows a typical oscilloscope photograph of scatter reflected via the F -layer. The transmitted signal, which would otherwise appear as a vertical deflection at the left of the pattern, has been partially cancelled in our set-up by a "gate" in the audio system. The short vertical lines are range markers. Otherwise, this picture corresponds to that of Fig. 2, and is typical of daytime conditions at the higher frequencies.

Echo Interpretation

Various considerations complicate interpretation of the echoes seen. In the first place, the reader might wonder why a relatively narrow and well-defined echo appears at all. Since scatter comes back from *all* points beyond the edge of the skip zone it would be reasonable to suppose that one continuous band of echoes, starting at a range corresponding to the edge of the zone and extending on out, would appear. In point of fact, the echoes fall off in amplitude very sharply as range increases, leaving a well-defined clump at one particular point along the time base. The reason for this is complicated, but a rough idea may be gained from Fig. 4. Assume for simplicity that the ionosphere is a perfect metallic reflector. The time delay with which each bit of scattered

energy arrives back at the receiver must be proportional to the total length of path travelled. We may now draw a series of lines, as shown in the figure, representing ray paths each successively longer than the adjacent one by equal increments. Signals travelling out and returning along these paths will have equal increments of time delay, and will be equally spaced across the oscilloscope time base.

Now notice the angular separation in the vertical plane between adjacent paths at the transmitter, and consider what would happen if the transmitter radiated equal amounts of power into equal increments of vertical angle. It can be seen that the zones fairly far out from the transmitter, and corresponding to low angles of radiation, will then receive a much smaller fraction of the total power (because the angle between adjacent rays at the transmitter is small) than the zones closer in and illuminated by higher-angle radiation. Furthermore, the proportion of incident radiation scattered backward can be expected to become smaller as the angle at which the radiation strikes the ground decreases.

Thus, echoes with longer time delay tend to disappear into the noise level, because they are excited by less total power from the transmitter, and because the ground is a poorer reflector at low angles. The strongest will be those corresponding to the edge of the skip zone. The above remarks are by no means a complete explanation of this effect; they do serve, however, to bring out an easily overlooked aspect which plays an important part in the end result.

Thick Ionosphere

To represent the reflecting powers of the ionosphere in terms of a metal sheet is not a bad ap-

TABLE I

A = Time Delay to Leading Edge of Scatter Signal (See Fig. 2) Expressed in Equivalent Kilometers of Range
 B = Actual Ground Distance to Edge of Skip Zone in Kilometers (See Fig. 5)

F-Layer (Assumed 300 km. High)		Sporadic-E Layer (Assumed 100 km. High)	
A	B	A	B
1000	790	300	220
1200	1010	500	445
1400	1230	700	670
1600	1445	900	890
1800	1650	1100	1090
2000	1855	1300	1290
2200	2065	1500	1490
2400	2270	1700	1690
2600	2475	1900	1890
2800	2675	2100	2090
3000	2875		
3200	3075		
3400	3275		
3600	3475		
3800	3675		
4000	3875		

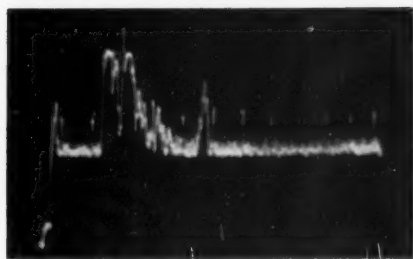


Fig. 3 — A-scope photograph showing scatter propagated via F-layer. Partially-cancelled transmitted signal at left. Weak multiple appears at right. Short, equally-spaced lines are 500-kilometer range markers.

proximation in the case of a thin layer such as sporadic-E; however, elaboration is definitely required when reflection occurs in a thick layer such as the F. The ray penetrates a thick layer to a depth which varies with the angle of incidence and, of course, the radio frequency. Investigation of the detailed mechanism shows that the first energy which arrives back by long scatter is not that which was reflected from the ground at the edge of the skip zone. It corresponds, instead, to energy actually scattered from points well beyond the skip zone.

Fig. 5 is a reasonably accurate representation of the ray geometry which actually applies in Fig. 1, but which was omitted there for simplicity. Path (a) represents a ray leaving at a vertical angle so steep that it penetrates the layer completely. Ray (b) is the first actually to be bent down to the earth, striking the ground well beyond the edge of the skip zone. This is the so-called upper, or Pedersen, ray. As the angle of take-off is further decreased, a ray is presently found which returns to earth at the shortest possible distance from the transmitter. This is path (c) which defines the edge of the skip zone. Path (d), leaving at a still lower angle of take-off than the skip-distance ray, strikes the earth once again beyond the edge of the skip zone.

To tell which of these paths corresponds to the first energy to get back to the transmitter (the leading edge of the scatter echo) we must measure

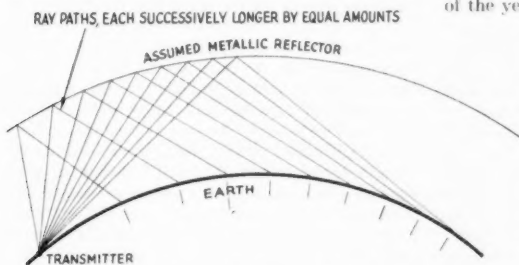


Fig. 4 — Even with a metallic "ionosphere," longer-delay portions of scatter echo will be weaker because a smaller fraction of total energy is radiated to areas far away.

their relative lengths. It might be thought that path (c), which strikes the ground nearest to the transmitter, would have the least delay. Actually, this is not so, since path (c) travels much farther in the layer than path (d). Careful inspection will show that d's total length is actually shorter than the others; hence the energy coming back along this path arrives home first.

It is clear that if we wish to know the ground distance to the edge of the skip zone, we must multiply the time delay to the leading edge of the scatter echo by a factor taking into account both the longer path of travel via the ionosphere and the reflection mechanics discussed above.

It is convenient to express the time delay A , in Fig. 2, in terms of the distance from the transmitter to a small reflecting object which we will assume to be actually producing the echo. We will call this distance "equivalent range." Since radio waves travel at 300,000 kilometers per second, and the measured delay is the result of a

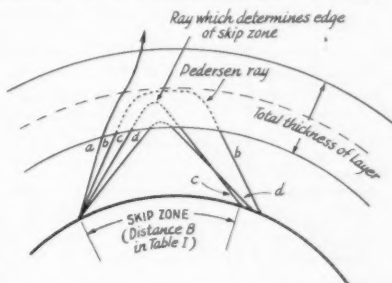


Fig. 5 — Accurate representation of reflection from a thick layer. Path d, which strikes the earth beyond the skip zone, is actually shorter than path c which determines edge of skip zone.

round trip to the assumed reflector and back, the delay A expressed in microseconds may be multiplied by the factor 0.15 to obtain the equivalent range in kilometers.

In order to convert "equivalent range" into ground distance to the skip zone, Table I may be used. This table assumes an equivalent height of reflection of 300 kilometers for the F-layer, a reasonable average value. Actually, the height will vary according to the time of day and season of the year, but the error introduced by making the above assumption can be shown to be small at the ranges given in the table. Sporadic-E heights also vary, but to a much smaller extent.

Unanswered Questions

From this it may be surmised that there are certain complexities which beset the precise interpretation of scatter echoes! Among the complicating factors which will undoubtedly be resolved by further study and experience are the effect of varying degrees of ground roughness, or storms at sea, on the interpretation

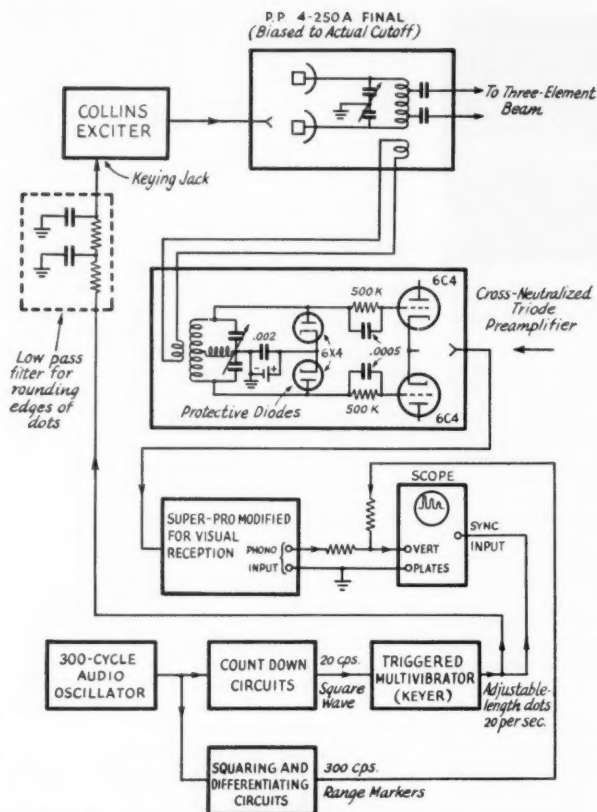


Fig. 6 — Scatter-sounding set-up used at W6YX with A-scope presentation.

of the records. (For example, DL6DS, a well-known ionosphere researcher, has detected echoes from the Alps reflected back to his ionosphere transmitter in northern German via the *F*-layer!)¹ In addition, the sporadic-*E* layer and the reputed nonreciprocity of the ionosphere, known to amateurs as "one-way skip," must not be overlooked.

One of the ways to verify scatter-sounding predictions would be to locate a number of transmitters at different points about the country and then to observe whether their transmissions appeared when the scatter indications said they should. Unfortunately, there are not enough continuously-operating commercial stations to make this possible, and if one had to supply one's own stations (and operators) the cost would be prohibitive. Amateur transmissions, on the other hand, provide a geographical distribution which can be obtained in no other way. Because of the obvious importance of the scatter-sounding technique to amateurs, it was resolved to conduct an

all-out test in the 14-Mc. amateur band. Furthermore, a three-element rotary beam was available with which to make the transmissions both directional and variable in azimuth.

Equipment Set-Up

Fig. 6 is a semiblock diagram of the complete scatter sounding set-up used at the Stanford Radio Club's station W6YX for A-scope display.

The rig consists of a Collins 310B1 exciter driving a pair of 4-250As in the final amplifier, usually operated at an input of 800 watts, key down, although with good conditions usable echoes have been received with the input as low as 40 watts. For reception, a Super-Pro was used, although any sensitive receiver would do. Receiver bandwidth is not at all critical, and on occasion, we have operated our Super-Pro in the No. 1 crystal filter position; a considerable improvement in signal-to-noise ratio results, but the filter is likely to "ring" if not adjusted carefully. Various minor modifications to the Super-Pro had to be made in order to prevent

overloading by the transmitter.

The triode preamplifier ahead of the receiver is needed primarily to improve the noise figure. The grid circuit of this preamplifier is coupled to the transmitter tank circuit so that the same antenna can be used for simultaneous transmission and reception. A diode, connected across the grid circuit and so biased so that it is normally non-conducting, protects the preamplifier tube and prevents loss of power when the transmitter is keyed. The *Q* of the grid circuit is so reduced, when the diode is conducting, that the coefficient of coupling with the tank circuit becomes small and negligible power transfer occurs. Further protecting the preamplifier tubes are the high series grid resistances. As soon as the preamplifier grids go positive, a high bias is developed across these resistances which limits the flow of grid current. Since the shunting capacitors are small, the bias built up discharges in a very short time interval after the transmitter goes off. This simple T-R scheme is ideal for c.w. break-in.

Superimposed on the video output of the Super-Pro are 500-kilometer range marker pulses, generated as shown in the figure. (These are seen

¹ W. Dieminger, "The Scattering of Radio Waves," *Proceedings of the Physical Society B*, Vol. 64, No. 2, pp. 142-158, February, 1951.

in the photograph of Fig. 3.)

The signal transmitted consists of a series of dots sent at the rate of about 20 per second (keying speed of 50 w.p.m.). They must be of short duration to permit good separation of the outgoing signal and the echoes, but must not be too short. A dot length of about one millisecond is used in this equipment. The keyer is a multi-vibrator with its output fed into the Collins exciter through a simple low-pass *RC* filter so that the sharp edges on the dots are rounded off. A reduction in the time constants of the key click filtering circuits was the only modification of the exciter needed. Although the keying cannot be made really "soft" because of the shortness of the dots, inspection of the signal at a receiving point a mile away showed that there was much less key click than accompanies the signals of a great many c.w. stations, and that clicks of appreciable amplitude do not exist more than a kilocycle or so either side of the operating frequency.

The final amplifier was loaded heavily and somewhat under-excited, so that saturation did not occur. As the single-sideband gang have found out, the amplifier tubes must be biased sufficiently to prevent plate current flow in the absence of signal, otherwise they will behave like diode noise generators! Fortunately, the smoothness of the dot waveshape is not appreciably affected by operating the tubes at true cut-off.

While a simple A-scope presentation will suffice when one is interested in measuring conditions over one particular path, for most convenient display of conditions over a large number of paths a plan position indicator, or PPI, display is desirable. In our case this display was obtained by mechanically coupling to the Gordon beam rotator a Selsyn which rotates a sine-cosine potentiometer inside the shack. With the aid of a gas-tube sweep circuit and this potentiometer a PPI sweep is generated, so that as the beam rotates a range-azimuth polar pattern is traced out on a Dumont type 304-H scope having a tube with a long-persistence (P7) screen.

Since ionosphere conditions are seldom the same in all directions from a given point of observation, a fairly sharp beam antenna is essential in order to avoid ambiguity. Fortunately, if the same antenna is used for both transmitting and receiving, a given amount of directivity does double duty. Fig. 7 shows the effective polar field-strength pattern of a three-element beam in this service. It is obtained by squaring the polar pattern of the antenna itself. We used the patterns of Cleckner² as the basis for the figure.

Receiving Arrangements

The ham signal receiving end of the scatter-sounding test was handled in a building about 200 feet away from the transmitter. Two Collins 75A-1 receivers were connected to a 14-Mc. folded dipole strung roughly north and south at a height of 30 feet. The three-element transmitting beam, being 50 feet high, thus had a height ad-

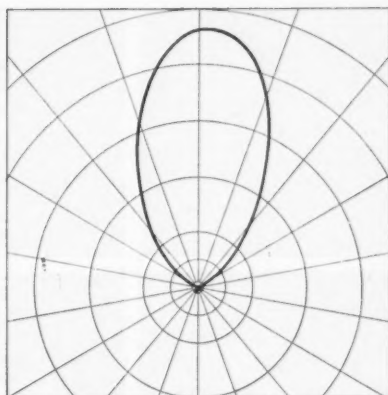


Fig. 7—Effective field-strength pattern of three-element beam when used for scatter sounding.

vantage over this dipole, but both antennas are located on a ridge offering a clear field of view toward the east all the way from north to south. Each receiver covered one-half of the U. S. 'phone band. A team of operators, under the guidance of W6VUW, manned the receivers in shifts. Stations in contact with each other, or making directional calls, were so indicated in the log, along with any statement as to power, antenna, etc., that might have been overheard. The direction of fire of the station's beam, as well as its power, have an obvious effect on its signal strength. Some 1400 log entries were made in all.

Explanation of the Photographs

The PPI photographs are arranged to form a series showing the appearance of scatter as the band opened on the morning of December 15th, and as it faded out on the night of December 14th. Showing the morning hours first is preferred because the ionosphere tends to be the most stable then. The chance of encountering sporadic-E seems to be less at that time. It helps in viewing the pictures to start out with conditions as nearly normal as possible. (The West Coast, incidentally, is an ideal location for a test of this sort, since the majority of stations lie to the east as the band opens up in the morning.) The times shown are Pacific Standard. During the hours of the day when conditions were relatively stable, runs were taken at 15-minute intervals. During the hours when rapid changes occurred, runs were taken at five- or ten-minute intervals as required in order to follow the various developments. Each run took about one and one-half minutes, or enough time for the beam to complete one revolution. Interference from the transmitter, although somewhat annoying, did not interrupt the station-logging operations in the adjacent building.

In these pictures, north is at the top or 12 o'clock position, east is at 3 o'clock, and so on. In order to prevent the transmitted signal from brightening the center of the picture excessively,

² D. C. Cleckner, "Parasitic Beam Patterns," *CQ*, Vol. 4, No. 7, pp. 25-29, July, 1948.

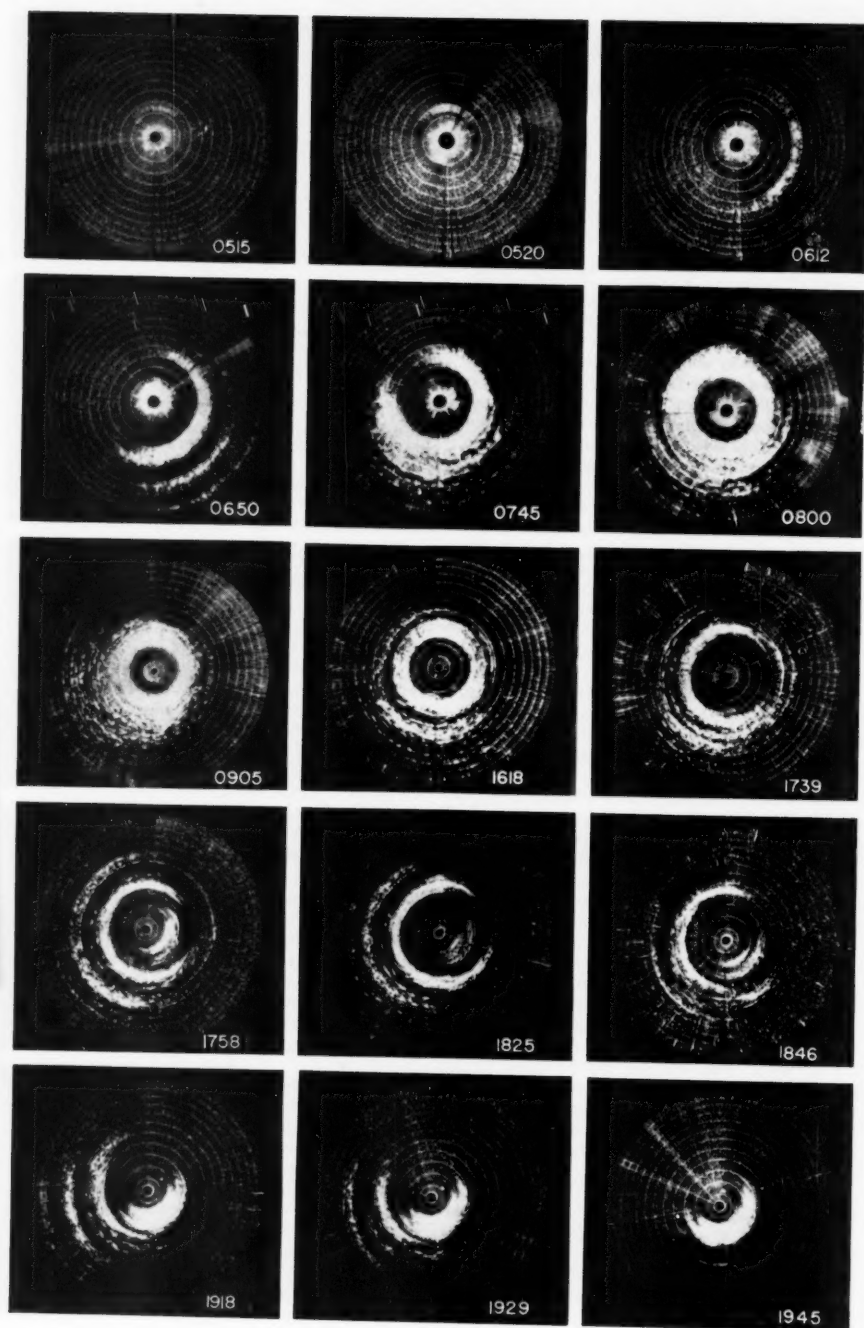


Fig. 8 — Scope patterns of scatter soundings over a 24-hour period.

it has been cancelled out by a "gate" in the audio lead. This leaves a hole in the center of the pattern where the "main bang" would otherwise be. There is a slight brightening at the edge of this hole due to a portion of the main bang leaking through the edge of the gate. The first, or 500-kilometer equivalent range circle, is visible well outside of the brightened edge of the hole. Additional equivalent range circles follow at 500-km. intervals. The grey background of the pictures is the noise output of the receiver, which is always operated nearly wide open. Signals appear as bright spots or patches amid this "noise."

Discussion of the Photographs

The first picture, at 0515, shows no noticeable *F*-scatter. Actually, a very small amount could be seen with the aid of the A-scope. The band is essentially "dead" at that hour — only a few very weak signals are audible. The white splotches in the vicinity of the first range circle are transitory echoes caused by meteors. These echoes, quite frequent during the morning hours, taper off during the day and are seen much less often in the evening. Also noticeable at 0515, and again at 0520, is a patch of scatter reflected by weak sporadic-*E* extending from NNW to NNE between the 1000- and 1500-km. range circles.

At 0520 the first sign of *F*-scatter appears to the east and slightly south of east between the 3000- and 3500-km. range circles. At this hour the layer ion density is such that only one-hop transmission to the east can take place. However, conditions are relatively unfavorable for this type of transmission, and both scatter and signals are relatively weak.

Shortly after 0612, two-hop transmission opens up, and by 0650 we have strong *F*-scatter extending from NE to SW. To the SE may be seen two multiples forming fragments of additional concentric scatter rings. By 0745 the main scatter ring has nearly encircled the station, the band being still "dead" only to the NW. The multiples to the SE are now weaker, and by 0800 the third has disappeared and the second coalesced with the first into one virtually solid mass. It is now 1100 on the East Coast, and signal absorption caused by low-level ionization excited by the sun's ultraviolet light is beginning to have an effect. By 0905 the scatter ring is relatively thinner to the east, owing to absorption, than it is to the north, west and south.

From 0905 on throughout the day the *F*-scatter ring changes very little in appearance, its inner edge hovering close to the 1000-km. range ring at this time of year. By 1618, however, it has begun to move outward as the ion density decreases with the approach of evening. The sun's vertical rays are now falling on the earth to the west of our station; consequently, the multiples are stronger to the south than they are due west. By 1739 the range to the eastern section of the ring is lengthening, and at the same time the echo is becoming weaker. At 1758 a definite gap in the *F*-scatter appears, but a sporadic-*E* patch has suddenly appeared to the SE, extending inward

to about 750 km.

These sporadic-*E* patches are not uncommon, and may be tracked with ease by scatter sounding. Their cause is as yet unknown. This particular patch persisted and grew in size and intensity during the evening, as the remaining pictures show. Its range closed somewhat, but there was no marked drift as has sometimes been observed. The *F*-layer scatter gradually decreased in extent and had disappeared completely to the SW by 1945.

Explanation of Maps

Data from the scatter photographs are compared with received signals on the summary maps, which are arranged in the same order as the PPI photographs. Each map is a great-circle projection centered on San Francisco, which admittedly introduces some error at the shorter ranges since Stanford University is some 30 kilometers south of that city. However, at ground distances greater than about 700 km., this error may be neglected. The circles on the maps now represent ground distances in multiples of 500 km. The equivalent range to a particular scatter patch appearing in a PPI photograph is scaled off, converted to ground distance with the aid of Table I, and plotted in the appropriate position on the maps. Each received signal is designated by a dot at its location and a number representing the S-meter reading. (These did not exceed S9 even in the case of the strongest signals because the 75A1 meters are inherently Scotch and because resistive pads were used to prevent receiver interaction when working from a common antenna.) When a given station was calling a directional CQ, or was in QSO with another station whose QTH was known, the direction of fire of its beam antenna (assuming it had one) was indicated by an arrow. This information is occasionally helpful.

In interpreting these maps, the reader should bear in mind that if a scatter patch appears, and no ham signals are logged from or beyond it, one is not justified in concluding that transmission from that area was not possible, since there is no guarantee that a station was on the air in the indicated region at that particular time. The existence of a ham signal, when logged, should merely be regarded as corroboration of the transmission possibility indicated by the scatter. It is also worth pointing out that once scatter appears, it is normal to hear signals coming from beyond the scatter patch, since the scatter itself will always tend to be concentrated just beyond the edge of the skip zone. Signal readings, of course, should be taken with a considerable grain of salt since there will be large variations between stations owing to power, location, and antenna differences. On the average, however, these readings will indicate a trend.

Discussion of Maps

The map at 0515 shows only a few weak signals. The stations along the Atlantic seaboard are believed to be audible via one-hop Pedersen

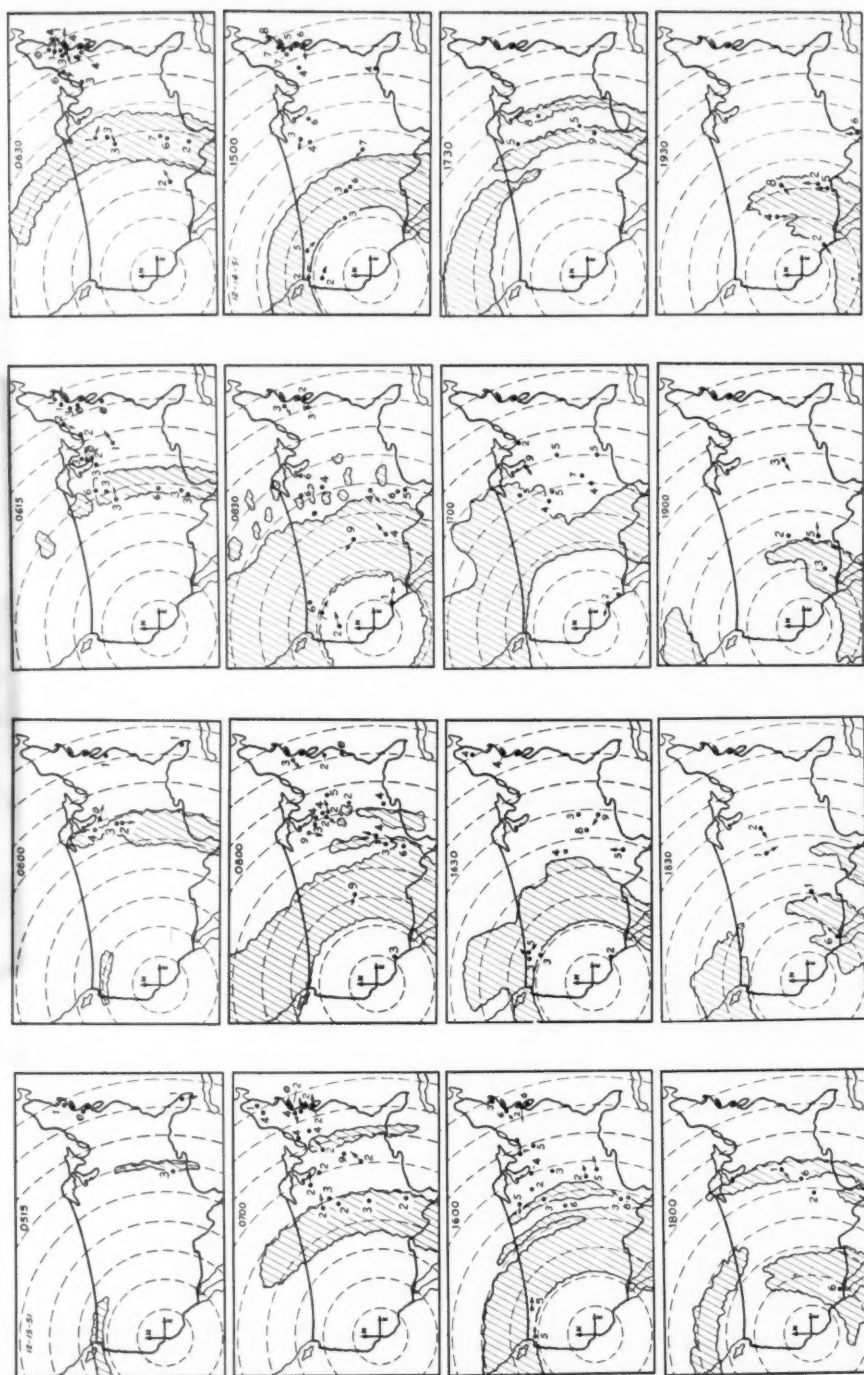


Fig. 9 — Correlation of scatter soundings with observed signals.

ray transmission, which for this distance (approximately 4000 km.) involves an angle of take-off of almost zero degrees. The distance and angle are at the extreme limit for one-hop transmission, and during the winter months the height of the ionosphere is too low for normal one-hop at this distance. The upper (or Pedersen) ray, however, does get through, although feebly. Transmission via this ray is so weak that it does not produce any detectable 4000-km. scatter echoes with our set-up. As time passes and the layer becomes more highly ionized, a detectable scatter patch builds up by means of normal transmission at a distance of about 3000 km., which is a more reasonable jump for normal single-hop in view of the layer height at this time of year. The angle of take-off for a hop of this length is only 4 degrees, however, and both ham signals and scatter are weak because (among other things) few antennas radiate much at this low an angle. The plot for 0600 shows various stations getting in by this method. Presently, by 0615, the ion density builds up to the point where two-hop transmission becomes possible to the East Coast. This is shown by the sudden jump in number and intensity of the East Coast signals. By 0630 the edge of the skip zone has moved into a distance of 2000 km., and all the signals tend to be stronger, since the angle of take-off for such a hop is 12 degrees.

By 0630, the two hops by which the signal reaches the East Coast have become of approximately equal length. At 0615, as may be seen, the hop between San Francisco and the Kansas area is actually longer than the hop between Kansas and the East Coast, because the sun is up higher in the east and the ion densities have risen sufficiently to support a shorter hop.

At 0700 the skip zone is still moving in, and by 1830 it has reached its stable value for the day.

In interpreting these records, it should be remembered that what one does *not* expect is to hear a number of strong signals originating from points well inside the skip zone. This is verified surprisingly well by the entire series of records. Weak signals from stations inside the skip zone occasionally appear and may be explained as transmission bounced indirectly from one place to the other via the area in which scattering takes place instead of directly via the layer. The 0830 record shows two excellent examples of this. The "2" signal in the skip zone to the north was W7FPY in Eugene, Oregon, who was logged in contact with a W2. The "1" signal in the Los Angeles area was W6DI, who at that hour was talking to a station in Oklahoma. Both these signals undoubtedly reached Palo Alto via backscatter. The 0630 record shows what is apparently a genuine report from a station inside the skip zone; this could also be explained by backscatter transmission, but various other possibilities (such as mistaken call letters) exist and we would rather not hazard an opinion.

The 1500 map begins a series showing the collapse of the band at night. The 2 report inside the skip zone is probably backscatter. Had our re-

ceiving installation been equipped with a three-element rotary, it would have been easily possible to resolve whether transmission was via scatter or not, by rotating the beam and noting whether the direction of strongest signal coincided with direction to the station. If back-scatter is the answer, there will in general be no well-defined best direction unless the station is using a beam; in that case, the strongest scatter signals would be coming back from the direction in which the beam was firing.

The 1630 record includes W6DI again, now S2, and the receiving operator logged the signal on the basis of its fluttery sound as "definitely backscatter." The skip zone has now begun its outward march, and by 1730 transmission to the east has become distinctly spotty.

By 1800 the sporadic-E patch which has developed in the south is bouncing in a strong signal, and remnants of the *F*-layer to the east are still effective in bringing in a few eastern stations. By 1830 the *F*-layer is gone, but a few relatively weak Easterners linger on. The station shown at 1900 was overheard to say, however, that he had been hearing W1s and W4s for the last two hours, which suggests that a sporadic-E patch, perhaps similar to the one seen to our southeast, must have existed over the eastern part of the United States. (The maximum range at which sporadic-E scatter may be seen from any location is about 2000 km., because the layer is so low.) This being the case, the eastern stations *might* have been getting in via two-hop sporadic-E transmission. At any rate, this is a possibility one would wish to investigate further.

By 1930 the gang has become aware that good short-skip conditions prevail, and the number of stations taking advantage of the sporadic-E patch has considerably increased. On that particular evening, the patch obligingly stayed in for quite a long time: further records are not shown because there was so little change in the general behavior.

Conclusions

In considering the results of any test of this sort, a statistical approach should be used. That is to say, the accuracy of each individual piece of data can not be guaranteed because of the many uncertainties involved. It is only permissible to hope that on the average, the results will agree with expectations. Viewed in this light, the results of the test are quite encouraging. It seems safe to conclude that:

- 1) Satisfactory scatter soundings may be made with the aid of ordinary amateur transmitting and receiving equipment. The necessary apparatus modifications are relatively minor.

- 2) The beamwidth of the standard three-element rotary beam provides adequate resolution for this work.

- 3) Scatter soundings do in fact show the areas to which radio transmission is possible, both via *F*-layer transmission and sporadic-E.

- 4) The sensitivity of the indication is surprisingly great. For example, as the band opens up,

scatter appears almost simultaneously with normal *F*-layer propagated ham signals. Similarly, when strong signals reflected by the sporadic-*E* layer are heard, scatter is invariably present.

Acknowledgment

The test described in this article was carried out as an amateur activity by the authors working for the most part on their own time. They were assisted in this by various members of the Stanford Radio Club, many of whom made valuable contributions to the end result. Particular thanks are due W6VUW, W6TOT, W6WZD, W6FZB, W6VLC, and W6AOF. The assistance of the U. S. Office of Naval Research in making available certain of the equipment, and in reducing the data, is gratefully acknowledged. Thanks are also due the staff of the CRPL-supported Ionosphere Research Project at Stanford University, and particularly R. A. Helliwell (W6MQG), its director, for stimulating comment and for valuable ionosphere data. To W6WB we are indebted for an ingenious method of coupling an external Selsyn to our rotary beam.

Selected References on Scatter Sounding

- Edwards, C. F., and Jansky, K. G., "Measurement of the Delay and Direction of Arrival of Echoes from Nearby Short Wave Transmitters," *Proc. I.R.E.*, Vol. 29, pp. 322-329, June, 1941.
- Benner, A. H., "Predicting Maximum Usable Frequency from Long-Distance Scatter," *Proc. I.R.E.*, Vol. 37, pp. 44-47, January, 1949.
- Kono, T., "Experimental Study on Scattered Echoes," *Report of Ionosphere Research in Japan*, Vol. IV, No. 3, Maruzen Publishing Co., Tokyo, 1950.
- Dieminger, W., "The Scattering of Radio Waves," *Proceedings of the Physical Society B*, Vol. 64, No. 2, pp. 142-158, February, 1951.
- Peterson, A. M., "The Mechanism of *F*-Layer Propagated Back-Scatter Echoes," *Journal of Geophysical Research*, Vol. 56, No. 2, pp. 221-237, June, 1951.
- Abel, W. G., and Edwards, L. C., "The Source of Long-Distance Backscatter," *Proc. I.R.E.*, Vol. 39, No. 12, pp. 1538-1541, December, 1951.

Silent Keys

IT is with deep regret that we record the passing of these amateurs:

W1MAL, Harold W. Taylor, Cochituate, Mass.
 W1MEY, John H. Ferrier, Brighton, Mass.
 W2GJV, J. Carl Drumm, Collingswood, N. J.
 ex-W3FWS, Emerson Lessig, Pottstown, Pa.
 W3GCQ, L. J. Kepler, Trumbauersville, Pa.
 W4DRE, L. M. Sparks, Gaffney, S. Car.
 W4EM, Dr. W. Wright Mitchell, Memphis, Tenn.
 W4JVT, Marcus O. Nielsen, Miami, Fla.
 W4SAH, Edward L. Schacht, Orlando, Fla.
 W6SGC, Dr. Edgar H. Brown, Los Angeles, Calif.
 W6UBY, Rudolph Strametz, La Crescenta, Calif.
 W8KWF, Thomas A. Gill, Grandville, Mich.
 W9PNL, Howard E. Lasansky, Milwaukee, Wis.
 ex-W9WHI, Oscar E. Suddarth, Louisiana, Mo.
 ex-C1BAR, Cecil A. Landry, Halifax, N. S.

Strays

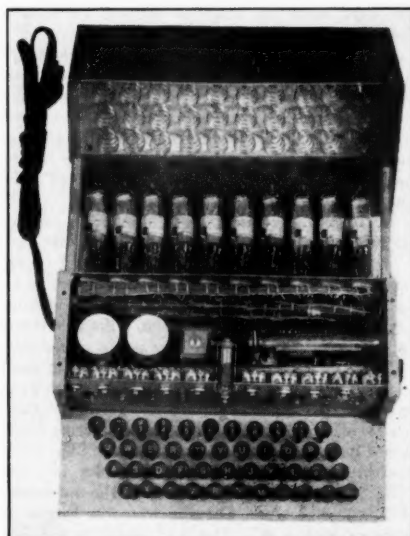
W5SON thinks her call not too appropriate for her present status — she has two small daughters. — W1QON

ZS6XQ is home. After extensive medical treatment in this country made necessary by a 1947 sports accident, Louis Nel returned to Mafeking, his condition improved. The many months of confinement caused by paralysis were eased through the untiring efforts of ham and non-ham friends here and abroad (Aug., 1951, *QST*, p. 68).

A committee with W1BB as chairman raised a substantial fund to provide Louis and his mother gifts — "going-home" presents — in token of friendship and esteem on behalf of U.S.A. radio amateurs. These included a wire recorder, record player and 1200 ZS6XQ QSL cards, the latter with best wishes for a fast DXCC.

Louis is now active on 28 Mc. and intends to tackle 20 meters soon. His brother, ZS6JL, is also active.

The entire amateur radio fraternity, we are sure, wishes Louis Nel an early and complete recovery.



Nathaniel G. A. Dorfman of New York City has developed an instrument with a typewriter keyboard — the Dorfman Electronic Brain Codewriter — which electronically produces International Morse Code at speeds variable from 10 to 125 w.p.m. Output leads from an internal relay may be used to key a transmitter.

A built-in monitor arrangement permits the user to check his own "sending." Letter and word spacing are controlled by the operator's typing speed and technique. The unit, smaller and lighter than an ordinary typewriter, contains a power supply of the selenium-rectifier voltage-doubling type to provide power for twenty-nine 6J6 dual-diodes and ten 2D21 thyatrons. The Codewriter operates from a 115-volt a.c. source.

Pointers on the Installation of Mobile H.F. Converters

BY BASIL C. BARBEE,* WSFPJ

WHILE most constructional articles and instruction sheets on converters devote some space to their installation, there are a few points that could stand more emphasis, if the ultimate in performance is to be derived.

1) When tapping the b.c. receiver to furnish the converter's power, it's a "stitch in time" to install a socket in which the converter's power cable is plugged, to facilitate subsequent disconnection for servicing. While you're at it, a relay to "kill" the plate supply at the vibrator while transmitting is quite worth while. Alternatively, the B+ lead to the converter may be routed through a spare pair of contacts on the transmitter control or antenna relay. Many mobile operators are forced to turn down the volume control on the b.c. set each time they transmit because of the lack of this feature.

2) All power leads should be shielded, to prevent pick-up of ignition noise. As an added precaution, it is well to by-pass each lead to ground with a disk ceramic condenser of 0.005 μ fd. or so. If a noise-limiting system is used external to the b.c. receiver, its leads must be individually shielded (from each other), not only to prevent noise pick-up, but to prevent the very noise the limiter is intended to limit from by-passing the limiter through inter-lead capacity.

3) If your particular b.c. receiver has "mechanical" pushbuttons, it is feasible to preset one button to the output frequency of the converter. If its pushbuttons are "electrical," i.e., if pushing the buttons substitutes preset tuned circuits for those tuned by the dial, a considerable improvement in both gain and selectivity will probably result from using the "manual" or "dial" position, as such sets are usually designed to receive local stations only on the preset positions, and use fewer tuned circuits when operating on a preset pushbutton. A difference of 20 db. in gain between pushbuttons and dial is not uncommon. If your car is equipped with a "Signal-Seeker" radio, better install a switch to disable the seeking mechanism when the converter is on, unless the converter puts out enough thermal noise in a narrow-enough band around its

supposed output frequency to be "sought." Otherwise you may have to use both hands to tune in a desired signal on the converter.

4) To avoid impairing performance on the b.c. band, make the antenna lead from the converter to the b.c. set as short as possible, and of the lowest-capacity obtainable, such as is commonly used for antenna lead-ins on car radios. With the converter connected, but switched "off" (so that the b.c. antenna is switched through to the b.c. receiver), trim the antenna circuit of the b.c. receiver as prescribed for that model (usually around 1400 kc.) on a very weak signal, in order to compensate for the added capacity. Next, set the dial of the b.c. set to the converter output frequency, turn on the converter, and trim the output circuit of the converter, either with a signal generator coupled to the mixer grid in the converter, or with a signal picked up off the air. In the absence of both signal sources, tuning for maximum rush-noise should be satisfactory.

5) The converter's antenna trimmer should be peaked for maximum output at the center of the band with the antenna with which it is to be used, installed and connected the way it is to be used. Peaking at band center instead of at a point near the high end is recommended here, since we are concerned only with h.f. converters having a narrow tuning range ("percent-age-wise") with a high ratio of signal-frequency-to-i.f., making for little difficulty with tracking. If alignment is perfect at the center of the range, then reactive effects of the antenna and transmission line not taken into account in the design of the converter will cause but little tracking error at the edges of a narrow band.

6) One final kink: If the converter has a pilot light that glares too brightly at night, there is a simpler way to dim it than by inserting a resistor in series. Simply paint the inside of the jewel with pilot-bulb or fingernail lacquer of a complementary color; for instance, on a red jewel, use green lacquer.

I hope the foregoing will help somebody get better reception, for it is written, "If you can't hear 'em, you can't work 'em."

* 854 S. Fredonia, Nacogdoches, Texas.



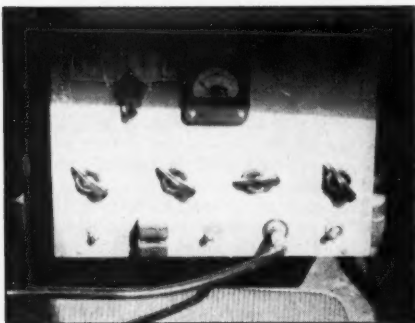
Twenty Watts Mobile for All Bands

A Simple Bandswitching Circuit for 75 to 10

BY J. ROY WOLFSKILL,* W2RPU

THE unit shown in the photographs is a complete bandswitching mobile transmitter, including modulator, and covering all bands from 4 to 29 Mc.

The circuit diagram is shown in Fig. 1. Either crystal control or VFO is available simply by snapping the toggle, S_1 . A 6C4 is used in the VFO and this is the only indirectly-heated tube in the transmitter. All others are direct-heater types. The heater of the 6C4 operates from a separate circuit through S_2 so that it can be left on during receiving periods. This cuts down initial drift and



The bandswitching transmitter installed under the dashboard in W2RPU's car. The control knobs in line across the panel are, from left to right, for VFO, first 5618, second 5618, and final amplifier. The meter switch is to the left of the meter. Along the bottom are the VFO-xtal switch, a dual crystal holder (one socket unwired for spare), the frequency-multiplier switch, S_2 , microphone-control jack and the VFO heater switch.

eliminates waiting for the cathode to come up to temperature before each transmission. VFO output is taken from the cathode tap to minimize loading effects on frequency. The tuning range of the VFO is limited to 3500 to 4000 kc. This makes it necessary to use crystal control on 11 meters, unless it is desired to extend the VFO range. The plate voltage for the VFO is stabilized by an 0B2 regulator tube.

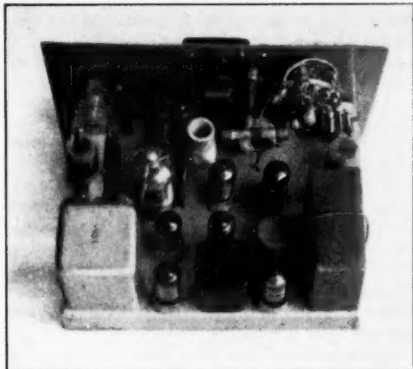
The 5618 following the VFO may be used as an 80- or 40-meter crystal oscillator, or as an amplifier or doubler for the VFO, since the output circuit, C_9L_2 , will tune to either band, one near maximum capacitance and the other near minimum.

The next stage, also using a 5618, may be operated as a doubler to 14 Mc. or a quadrupler to 28 mc., depending on the setting of C_{13} which covers both bands. This stage is inserted or re-

• The construction of the all-band mobile transmitter shown in the photographs is not unique, although it measures only 6 by 6 by 9 inches. However, the circuit has several novelties and short cuts that should be of interest to any mobile man, even though he may choose to build a similar unit in different form to fit available space.

moved from the circuit by S_3 . Thirty volts of fixed bias from the modulator-biasing battery practically cuts off plate current to the 5618 when this stage is not in use.

A 5516 is used in the final amplifier. This tube has the same power rating as the 2E25, but it is shorter physically so that it can be fitted into a smaller space. The use of an all-band tuner¹ in the final-amplifier output circuit eliminates the necessity for plug-in coils or switching. C_{19} is a dual midget Hammarlund, originally of 140 μmf . per section. To obtain the desired range, one rotor and two stator plates were removed from each section. The high-frequency coil, L_4 , is mounted vertically at the rear of the condenser, while L_5 is placed at right angles alongside the condenser to minimize coupling between the two. Care should be taken to make sure, with a grid-



Inside view of the all-band mobile transmitter. The chassis measures $8\frac{1}{4}$ by $5\frac{3}{8}$ by 1 inches. The four tuning condensers are lined up across the panel just above the chassis level. L_4 and L_5 are to the left, mounted as described in the text. L_3 is mounted vertically behind the meter. L_2 , at right angles, is fastened to capacitor C_9 . L_1 is vertical behind C_1 . The r.f. tubes are lined up across the center of the chassis. The 6C4 is hidden by the biasing battery to the right. The audio components and the 0B2 occupy the rear portion of the chassis. All small components are mounted underneath.

* 113 Ringdahl Court, Rome, N. Y.

¹ Chambers, "A Two-Control VFO Rig with Bandpass Exciter," QST, August, 1950, p. 24.

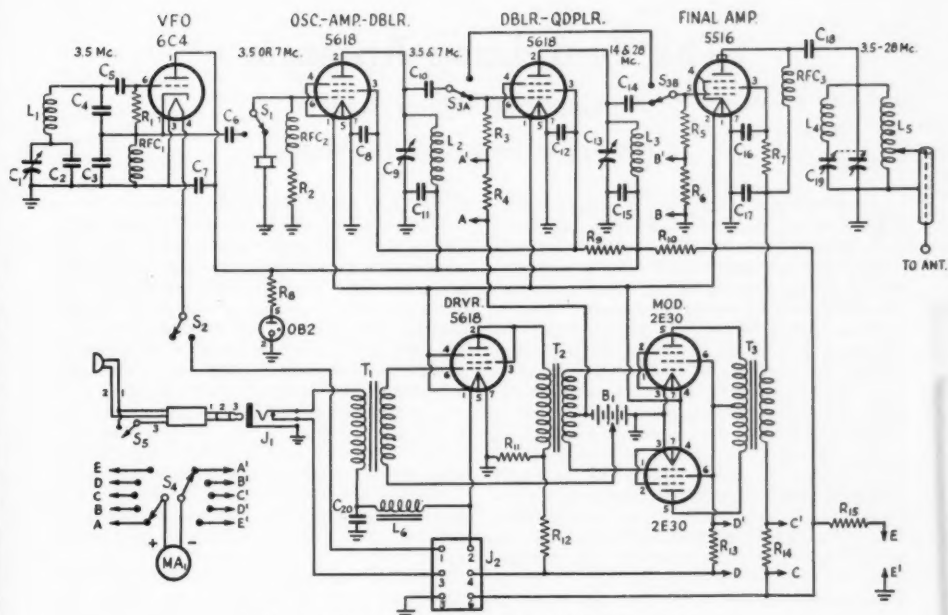


Fig. 1 - Circuit diagram of the all-band mobile transmitter.

- C₁ — 50- μ fd. variable (National PSE-50).
 C₂ — 100- μ fd. silvered mica.
 C₃, C₄ — 0.001- μ fd. silvered mica.
 C₅, C₆ — 100- μ fd. mica.
 C₇ — 0.01- μ fd. mica.
 C₈, C₁₁, C₁₃, C₁₈ — 0.001- μ fd. mica.
 C₉, C₁₀ — 100- μ fd. variable (National PSE-100 with $\frac{3}{4}$ -inch shaft).
 C₁₀, C₁₄ — 47- μ fd. ceramic.
 C₁₆, C₁₇ — 0.001- μ fd. 1000-volt mica.
 C₁₈ — 0.01- μ fd. 1000-volt mica.
 C₁₉ — 110- μ fd. per-section variable (Hammarlund HFD-140; see text).
 C₂₀ — 25- μ fd. 25-volt electrolytic.
 R₁, R₂ — 0.1 megohm, $\frac{1}{2}$ watt.
 R₃ — 56,000 ohms, $\frac{1}{2}$ watt.
 R₄, R₆ — 100 ohms, $\frac{1}{2}$ watt.
 R₅ — 27,000 ohms, 1 watt.
 R₇ — 2500 ohms, 5 watts.
 R₈ — 10,000 ohms, 2 watts.
 R₉ — 27,000 ohms, 2 watts.
 R₁₀ — 2000 ohms, 2 watts.
 R₁₁ — 56,000 ohms, 2 watts.
 R₁₂ — 5000 ohms, 2 watts.
 R₁₃, R₁₄ — Meter shunts made of resistance wire to provide for full-scale meter reading of 100 ma.
 R₁₅ — 0.15 megohm, 1 watt (value depends on meter used).

dip meter, that the circuit when completed does not tune simultaneously to fundamental and harmonic frequencies. This can be controlled by altering the coils somewhat. The RG-8/U antenna cable is tapped on L₅ at a compromise point that serves for all bands. Some slight improvement can be gained by adjusting the tap for the band considered most important. The antenna is a center-loaded whip with an adjustable tap on the coil. The coaxial cable feeds the whip in the usual manner at the base.

In the audio section, a carbon microphone drives a triode-connected 5618 which, in turn,

- L₁ — 48 turns No. 26 enam., 1-inch diam., $1\frac{1}{4}$ inches long (may have to be slightly modified to provide proper bandspread).
 L₂ — 28 turns No. 24 enam., 1-inch diam., $\frac{7}{8}$ inch long.
 L₃ — 9 turns No. 20 enam., $\frac{3}{4}$ -inch diam., $\frac{7}{8}$ inch long.
 L₄ — 16 turns No. 20 enam., $\frac{3}{4}$ -inch diam., $\frac{7}{8}$ inch long.
 L₅ — 19 turns No. 20 enam., $1\frac{1}{4}$ -inch diam., $1\frac{1}{4}$ inches long, tapped $4\frac{1}{2}$ turns.
 L₆ — 10-hy. 30-ma. choke (filter).
 B₁ — 30-volt battery with tap at $7\frac{1}{2}$ volts.
 J₁ — 3-contact open-circuit microphone jack (midgert).
 MA₁ — Milliammeter, 10-ma. scale.
 RFC₁, RFC₂ — 2.5-mh. r.f. choke (National R-50).
 RFC₃ — 2.5-mh. r.f. choke (National R-100U).
 S₁ — S.p.d.t. toggle switch.
 S₂ — S.p.d.t. toggle switch.
 S₃ — D.p.d.t. toggle switch.
 S₄ — 2-pole 5-position rotary switch.
 S₅ — Push-to-talk switch.
 T₁ — Midgert output transformer: single plate to 200 ohms (mic. connected to 200 ohms).
 T₂ — Driver transformer: single plate to p.p. grids for Class AB₂.
 T₃ — Modulation transformer, Class AB₂.
 NOTE: Power-connector connections as follows: (1) VFO heater, (2) other heaters, (3) push-to-talk control to power supplies, (4) +h.v. audio, (5) ground, (6) +h.v. r.f.

drives two 2E30s in the Class AB₂ modulator. Type 5618s were tried in the modulator but would not give sufficient output for satisfactory modulation. Microphone voltage is obtained from the car battery through the filter consisting of C₂₀ and L₅. No audio control is provided, since the gain is just about right for the carbon microphone used.

The milliammeter, MA₁, can be switched to read current at the important points in the circuit. When switched to position E₁, it can be used to check plate voltage for the amplifier stage.

(Continued on page 112)

The Twin-Loop Antenna

A Compact 20-Meter Array

BY THOMAS W. SWAFFORD, JR.,* WSHGU

A RECENT change in QTH by the writer brought about the requirement of erecting a temporary antenna for 14.2 Mc. between two natural supports approximately 28 feet high and 35 feet across. Past experience had shown that the usual folded dipole employed so often for such occasions just wouldn't "cut the mustard" on the low end of 20 'phone, therefore some other method was in order. All manner of concoctions were dreamed up to comply with space limitations. However, the temptation to try out a vertically-polarized arrangement in an effort to obtain lower angles of radiation than could be obtained with flat-topped beams, with the height restricted, was hard to resist. Equally as hard to resist was the temptation to use the $\frac{1}{4}\lambda$ loop that has been made so popular by the "Cubical Quad" boys. Combining these two vices brought forth the arrangement shown in Fig. 1. This antenna consists of two loops with $\frac{1}{4}\lambda$ sides. In order to obtain proper phasing a total of 4 half-wave elements is employed, although the array behaves as 3 magnetic dipoles vertically polarized, fed in phase with equal currents for broadside radiation. Thus both of the aforementioned ambitions are fulfilled.

The antenna may be looked upon as being 4 halfwave dipoles spaced $\frac{1}{4}\lambda$ except for the two center dipoles which are very closely spaced. Additionally, the ends of the dipoles are bent over 90 degrees and joined at current minimum points to form a loop. In order to place the currents of the two loops in phase the two center dipoles must be transposed. Inasmuch as the two center dipoles contain equal and in-phase currents and are very closely spaced at the magnetic loop, they may be regarded as being a single two-wire ra-

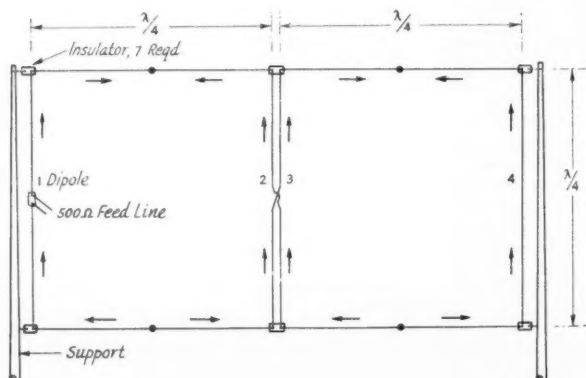
diator, from a radiation standpoint.

The mechanical construction of the array consists of a No. 12 copper wire 2λ long with $\frac{1}{4}\lambda$ points marked and threaded through the support insulators. The center section containing the transition point is held apart with regular transmission-line separators. The type used here are $3\frac{1}{2}$ -inch "Toni" plastic hair curlers. Each corner insulator is located at the $\frac{1}{4}\lambda$ point and arranged to conform diagrammatically with Fig. 1.

In general, the best point of feeding the array would be in the center at the point of transition in order to maintain balanced currents in the two loops; however, mechanical conditions may make it desirable to feed it at one end, as shown in the sketch. The small current unbalance caused by end feeding is then outweighed by mechanical convenience.

Terminal impedance for the end-fed array works out to be approximately 550 ohms (see Appendix I). In view of this, a 500-ohm open line was chosen for the transmission line. Although no actual standing-wave measurements have been made, the input terminals of the line at the transmitter appear reasonably free of any reactive component (line anti-resonant), which indicates the standing-wave ratio isn't excessive for most practical purposes.

The horizontal pattern is the usual figure eight with half-power points somewhere near 100 degrees. Front-to-side ratio is very high, thus producing an almost complete null off the ends. The vertical angle of radiation is quite low for this height which makes the moderate gain appear considerably higher than it actually is on DX contacts. Where the self and mutual impedances are known, it is a simple matter to find the array power gain over a halfwave dipole (see Appendix



* 559 Chestnut, North Tonawanda, N. Y.

II). This works out to be about 2 db.

It is interesting to compare the twin loop gain with that of two halfwaves spaced $\frac{1}{2}\lambda$ and fed in phase with equal currents. Such an arrangement gives a gain of approximately 3.8 db. with a terminal $Z_r = 28$ ohms at the center of either element when the two elements are connected with a halfwave resonant line. The apparent advantage of the higher gain of the latter is offset by the increased radiating efficiency of the twin loop. Moreover, the two halfwaves have reasonably narrow frequency bandwidths, whereas the twin loop may be operated over the entire 20-meter band without notably affecting the tank loading.

Further investigation into the behavior of broadside loop arrays indicates that optimum gain is to be had with critical over-all lengths. This is analogous to two halfwaves with optimum spacing. For example, three $\frac{1}{4}\lambda$ loops produce a gain of approximately 3.6 db. as compared to the 2.04 db. for the twin loop. The over-all length for three loops would be equal to $\frac{3}{4}\lambda$, which locates the two end dipoles at points where their mutual impedances are predominantly negative, thus giving rise to greater gain. Not only does the gain increase with a longer array but the radiation impedance also increases. This assures good radiation efficiency which is in sharp contrast with most conventional beams.

Additional calculated data are given in the accompanying table for N number of broadside loops. This table again shows the optimum array length to be multiples of $\frac{3}{4}\lambda$, i.e., 3 loops, 6 loops, etc.

Unidirectional radiation can be had with any number of broadside $\frac{1}{4}\lambda$ loops by backing up the driven elements with an identical array of loops spaced 0.15 λ and tuned to act like a reflector. Addition of the reflector will approximately double the power gain and lower the Z_r by a factor of approximately 4.

Gain and Terminal Z_r for N Number of $\frac{1}{4}\lambda$ Loops Fed In Phase

N	$Z_r \Omega$	$G_{db.}$
1	210	0.8
2	550	2.
3	600	3.6
4	700	4.7
6	1420	6.7
8	1550	7.4

The writer is aware that the discussion above is not completely analogous to vertical $\frac{1}{4}\lambda$ dipoles as described, but he feels the relation is sufficiently close to be comprehensible by most readers and offers results that do not differ appreciably from those found in ordinary practice. Actually, the $\frac{1}{4}\lambda$ loop theory is more nearly analogous to that of single-turn helical antennas whose circumference equals λ and whose pitch angle equals 0. However, this theory is far beyond the scope of this paper.

Appendix I

$$\text{Terminal impedance, } Z_r = \frac{E}{I} \quad (\text{I})$$

where: E = Applied voltage

I = Current at which the voltage is applied

This may be obtained by letting the applied voltage E be divided between the 4 dipoles, then

$$E/4 = I_1 Z_s + I_2 Z_{m1} + I_3 Z_{m2} + I_4 Z_{m3} \quad (\text{II})$$

where: I_1 = Current of No. 1 dipole

I_2 = Current of No. 2 dipole

I_3 = Current of No. 3 dipole

I_4 = Current of No. 4 dipole

Z_s = Self-impedance of No. 1 dipole

Z_{m1} = Mutual impedance between No. 1 and No. 2 dipole

Z_{m2} = Mutual impedance between No. 1 and No. 3 dipole

Z_{m3} = Mutual impedance between No. 1 and No. 4 dipole

Since $I_1 = I_2 = I_3 = I_4$, it follows that

$$E = 4I_1 (Z_s + Z_{m1} + Z_{m2} + Z_{m3}) \quad (\text{III})$$

Further, since the spacing of No. 2 equals No. 3 dipole at the magnetic loop, then

$$Z_{m1} = Z_{m2}, \text{ therefore, (III) may be written}$$

$$E = 4I_1 (Z_s + 2Z_{m1} + Z_{m3}) \quad (\text{IV})$$

Now, let $I_1 = 1$ amp., then the terminal impedance is approximately

$$Z_r = \frac{E}{I_1} = 4(Z_s + 2Z_{m1} + Z_{m3}) \quad (\text{V})$$

Considering $\frac{1}{4}\lambda$ spacing between radiating dipoles,¹ (V) becomes

$$Z_r = 4(70 + 82 - 13) = 556\Omega \quad (\text{VI})$$

Appendix II

Considering both sources to be in free space, the broadside gain in the horizontal plane is

$$G = \frac{N^2}{\left(\frac{Z_{oo}}{Z_{ed}}\right)} \quad (\text{VII})$$

where N = Number of dipoles with equal in-phase currents

Z_{oo} = Array element self and mutual real impedances and all possible combinations

Z_{ed} = Dipole self real impedance

Substituting values into (VII), the actual gain for the twin loop is

$$G = \frac{13}{\frac{2(70 + 40 - 13) + (4 \times 70) + (4 \times 40)}{70}} = 1.6 \quad (\text{VIII})$$

Thus,

$$G_{db.} = 10 \log_{10} G = 2.04 \text{ db.} \quad (\text{IX})$$

¹ Kraus, "Antennas," McGraw-Hill Book Co., first edition.

Strays

The Department of State is seeking radio engineers to set up VOA stations overseas. Salaries range from \$4719 to \$6807, plus a tax-free allowance for rent, heat, light, fuel and electricity. In addition, there is a variable cost-of-living adjustment at certain posts. Another differential is paid those employees serving at posts which are considered to have exceptionally difficult living conditions. Interested U. S. citizens of at least five years' standing who are willing to serve at any post abroad for a continuous period of not less than two years may obtain further information by writing a résumé of their qualifications to the Division of Foreign Service Personnel, 1734 New York Avenue NW, Washington, D. C.

• On the TVI Front

A NEW KISER ARTICLE

William L. Kiser, FCC radio engineer and author of the widely circulated and reprinted article¹ "TV Interference Problems," has written another clear-cut discourse on TVI. The new work, entitled "TV I.F. Interference . . . Where Does the Trouble Lie?," appears in *Radio-Electronics* for February 1952. Mr. Kiser discusses the TVI problems of radio amateurs and doctors using diathermy, defines the responsibility of service technicians to TV set owners, and outlines the obligations of TV manufacturers with respect to set design. The following excerpts from this pertinent article will be of interest to amateurs:

. . . When an amateur demonstrates that he can operate his transmitter without interfering with a television receiver *in the same room* it is ridiculous for the service technician to advise a television owner down the block that the fault is with the amateur transmitter. . . .

. . . The technician who uses the amateur . . . or "outside interference" alibi is not giving . . . service unless he can state *why* the interference is taking place. . . .

. . . The service technician puts himself in an awkward position when he agrees to service a poorly-designed receiver. . . . Before entering into an agreement to sell and service television receivers, independent distributors and service technicians would be well advised to find out just what action the manufacturer will take if it is established that certain types of interference are due to lack of design in the receiver. . . .

. . . Now that a rapidly expanding part of the television industry is expressing its willingness to co-operate, the licensed amateur can and will demonstrate that he is a co-operative and useful citizen pursuing an educational and interesting hobby. . . . It would seem about time that . . . licensed amateurs . . . and the televising public . . . get a fair shake in the television interference problem.

The publishers of *Radio-Electronics* have very kindly provided the League with reprints of this latest article. Interested clubs and individuals may obtain copies by writing ARRL Hq.

¹ *Radio-Electronics*, Jan., 1950. Reprinted in Feb., 1950, QST.

• In response to many requests, ARRL has made available reprints of the January QST article, "FCC's Plan for Handling TVI," by George S. Turner, Chief, Field Engineering & Monitoring Division, FCC. Write Hq. your needs.

WRITING TVI REPORTS

We had an opportunity recently to review a file of correspondence from Ken Adams, W8FLM, to his local FCC office in response to TVI complaints from an organized group of neighboring families. Ken being an industrial trouble shooter by occupation, the letters reflect his wide experience in writing a diplomatic yet factual report. A separate response was made for each case, broken down into three subdivisions: history, investigation, findings. Copies were sent to the complainant, serviceman (if any), the area radio council TVI committee, and one copy was filed with the station log. To lend weight to the reports, in instances where TVI was treated at a complainant's house a competent fellow-ham was taken along as an observer-assistant. The net result — a comprehensive and authoritative report leaving the decision for any further action up to the FCC engineer.

WITH THE CLUBS

TVI Organization of New York: This newly-formed group has been making rapid progress in meeting the TVI threat in the New York City area. The organization is primarily interested in hearing from local hams in instances where a complaint is received — after adequate attention to harmonics — from a TV set owner living at a point farther away than the site of a receiver that is not affected. In the short time the group has been in existence, agreements to service sets so affected have been worked out with RCA, Dumont, Stromberg-Carlson, Emerson, Crosley, GE, Admiral, Philco, Andrea, Westinghouse, Motorola, and Muntz. To achieve its objective of returning hams to the air, thereby bringing to a head any complaints of TVI, the group in January sponsored a highly-successful "Ten-Meter TVI Sweepstakes." A similar contest is scheduled for March 1st to 15th, with hams around the country invited to take part.

Mount Diablo (Calif.) Amateur Radio Club: The MDARC TVI committee has circulated questionnaires, pamphlets, and a chart showing the relationship of amateur harmonics to the TV channels in use in the area. In addition, the committee has been using an AN-APR-4 receiver (with coils for up to 300 Mc.) for making listening tests on amateur harmonics. In chasing down cases of TVI, some club members have found it convenient to team up in pairs, one operating the suspected rig while the other operates a mobile set-up for reporting back when the TV set owner doesn't have a telephone.

Inglewood (Calif.) Amateur Radio Club: Pursuing an aggressive campaign against TVI, IARC has prepared two form letters, one addressed to non-member hams and written in ham language, the other directed to TV lookers-in and written in layman's language. Both discuss the common problem and stress the need for coöperation.

Letters from the TV Receiver Manufacturers

If you'll turn back to page 38 of your February issue of *QST*, you'll find a copy of a letter that ARRL Headquarters recently addressed to the presidents of leading TV receiver manufacturers. A month later the following replies had been received.

BENDIX

Your letter . . . has been turned over to me for reply. I am very much interested in the information it contains, and think you have a very good point in promoting an increased awareness of the need for good immunity to amateur transmissions in television receivers.

We believe that our present receivers are quite good in this respect, and do not contemplate making any changes in the immediate future, especially since we are already committed for a considerable quantity of our present tuners and other components. However, we have a new model coming along which should be ready sometime this spring, and I am very much interested when the time arrives in taking advantage of your kind offer to permit us to engage in cooperative tests on interference susceptibility of these models at your laboratories. I think it is likely that representatives of our Service Department will also be interested in such a program.

— J. M. Miller, jr.,
Chief Engineer

NATIONAL

. . . we had the problem in mind when we developed the first TV receiver. That is why we used a 3.6-Mc. i.f. You can rest assured that when we go into production on a new model, we will have the points that you brought out carefully considered. . . .

— W. A. Ready, President

CAPEHART-FARNSWORTH

. . . I am sure that amateurs have done a very excellent job in eliminating transmitter difficulties, and I recognize that in the past the receiver manufacturers have not paid too much attention to the problems of providing adequate selectivity and rejection of signals, other than radiations from the television transmitter in use.

The Engineering Department at Capehart has given this problem a great deal of consideration, and the 1952 line, which will be introduced in the second quarter of this year, will include adequate preselection of signals in the tuner, plus very extensive shielding all through the r.f. and i.f. system. Incidentally, the intermediate frequency will be in the 40-megacycle region and we will provide good rejection to the band of frequencies involved.

In the near future I may take advantage of your kind offer to conduct tests on interference susceptibility. I would like to have you send me the location of your laboratory and the person we would contact so that during the field test period we can include this location in our itinerary.

— Antony Wright,
Vice President of Engineering

MAGNAVOX

I acknowledge with thanks your letter . . . which has been referred to our engineering department. We appreciate the precautionary stand you have taken in the matter of interference on the u.h.f. channels and your helpful attitude in this matter.

I am sure our engineers will want to take advantage of your kind offer of test facilities at the proper time.

— Frank Freimann, President

WESTINGHOUSE

. . . The subject of television interference, particularly with reference to interference caused by amateur stations and resulting from receiver difficulties rather than from spurious radiations, has always been of concern to us and we have considered this factor in our designs. As an example,

our receivers have a tuned input circuit ahead of the first grid having a Q as high as practicable, and for some time now we have used a 6AK5 input tube to achieve this result. To the best of our knowledge and from the records of our Service Department, we have had very infrequent complaints from our customers of interference of this type.

Your letter also expresses concern over the possibility of inadequate design in the u.h.f. range which may make the receiver susceptible to TVI. This also has been of concern to us and in our approved u.h.f. designs having application in our new receivers, we are using a single superheterodyne tuner feeding directly into a 41.75-megacycle i.f. and having two tuned circuits ahead of the crystal modulator. Our experience is that this is the only design that is free of undesirable spurious responses and at the same time gives the maximum in performance.

We shall be very happy to cooperate with you to determine comparative interference susceptibility in some of our new models. We shall be very pleased to send you some of our new chassis, including u.h.f. tuners, which should be available within the next few weeks, or if you prefer, we will have one of our engineers visit your laboratory and assist in this work. We would appreciate hearing from you as to how you prefer to conduct these tests. I feel that your interest in this matter should stimulate the industry to produce sets with greater freedom from interference.

— G. C. Larson,
Manager of Engineering

STROMBERG-CARLSON

I appreciate your letter . . . and your discussion of interference problems.

We have had cases of interference from amateur transmitters brought to the attention of our Service Manager, but fortunately these cases have been very few, possibly a half-dozen in the last two years. In each case we have corresponded immediately with the distributor or sales organization in the area, and they in turn have cooperated with the owners of the receiver and transmitter. We are of the belief that each of the cases has been solved in this fashion.

Our receivers are designed with the need for selectivity in mind, and our tuners particularly have been designed to suppress frequencies outside of the television bands. We have never built a television set without an r.f. stage, and the circuits have been designed for narrow band pass for the television channels with sharp attenuation on either side of the channel. Our present receivers use four variable tuned circuits in the tuner and associated coupling networks to assure selectivity. We will continue in our future designs to keep the need of selectivity foremost in our minds and can assure you of our diligence in this regard.

Thank you also for the kind offer of your laboratory facilities and engineering experience for making cooperative tests on interference susceptibility. I am referring this plus the entire correspondence to our Chief Engineer, Garrard Mountjoy, for consideration.

— Robert C. Tait, President

MOTOROLA

. . . We are quite cognizant of the fact that there have been competitive receivers on the market whose front-end selectivity has been inadequate. We feel rather proud of the fact that there has been only one instance of amateur interference concerning Motorola receivers that has been brought to our attention. This particular case was not due to poor front-end selectivity but was an image problem due to the fact that one of our models had the local oscillator on the low side of the signal. Inasmuch as Motorola alone was susceptible to this particular amateur signal, due to our

(Continued on page 112)

Getting Ready for 21 Mc.

Hints and Kinks for Modifying Equipment

BY GEORGE GRAMMER,* W1DF

THE 21-Mc. band has been in the offing for so long that it has come to be more of a mirage than a promised land. But as described in this month's editorial the machinery for putting the Atlantic City frequency allocations below 25 Mc. into effect has at last been approved by all concerned and is beginning to function. It is truly just a matter of time until the necessary shifts in frequency assignments are made and we find ourselves in possession of some new and interesting territory.

It's a good idea, therefore, to get ready for the great day even if we can't immediately use the red crayon to mark the calendar. Of course, a lot of us have been ready, so far as station gear is concerned, for a long time. Much of the multi-band equipment that has appeared in *QST* and the *Handbook* since the Atlantic City Conference has included 21 Mc. as a matter of course. Communications receivers offered for ham use cover the band automatically, many of them with special bandspread arrangements. The purpose of this article is to offer a few suggestions for those who aren't already in a position to open up on 21 the instant the band is available.

Receivers

The surplus military sets represent the principal problem in the receiving field, since the popular varieties stop short at about 18 Mc. The most satisfactory solution is to build a converter, and if you are interested in top-notch performance the crystal-controlled variety that has been featured in the last few editions of the *Handbook* is the type to build. In frequency stability and in signal-to-noise ratio it will compare favorably with anything you could buy or build.

For a quicker and simpler job, the one-tube converter circuit shown in current *Handbooks* for 10-11 meters easily can be modified for 21 Mc. The only change that is really necessary is to use a somewhat larger tuning condenser at C_1 so the input circuit will cover 21 as well as 28 Mc. A 30- $\mu\text{fd.}$ variable substituted for the 15- $\mu\text{fd.}$ unit specified in the circuit will do it. The oscillator and i.f. circuits need not be touched, since the oscillator range is such that the same i.f. can be used on both bands, the oscillator being on the high side of the signal for 21 Mc. and on the low side for 28.

Transmitters

The details of getting output on 21 Mc. from a transmitter that does not at present have specific provision for that band naturally will

vary with the circuit layout. However, the thing is basically simple. If the transmitter now covers the 14- and 28-Mc. bands the chances are that it starts out on 3.5 or 7 Mc. and uses frequency doublers to 14 and 28. In such case the principal change is that one of the frequency multipliers should triple from 7 to 21 Mc. This may or may not require a change in the circuit constants. Except for gang-tuned or bandpass rigs the probability is that the existing circuits cover a fairly wide frequency range. It is not unusual to find, for instance, that the tank circuit of a 28-Mc. doubler can also be tuned to 21 Mc. In that event the initial driving power on 21 Mc. can be obtained simply by connecting the grid of the 28-Mc. multiplier to a 7-Mc. driver instead of to a 14-Mc. source, and using the tube as a tripler instead of a doubler. The efficiency as a tripler may turn out to be a bit less than as a doubler, but this depends a good deal on the type of tube used. With the 6AG7, a currently-popular frequency multiplier, there is hardly any difference between doubling and tripling.

If the tuning range is not sufficient in the existing doubler circuit you can take the most convenient of two choices—either increase the tank inductance or the tank capacitance. The former is easier if the stage has a plug-in coil. A new coil having about twice the inductance—that is, about 40 per cent more turns in the same over-all length and same diameter—substituted for a 28-Mc. coil will tune to 21 Mc. with the same capacitance. If the 21-Mc. tripler is a former 14-Mc. doubler, the 21-Mc. coil should have about 70 per cent of the turns used on 14 Mc., again with the same over-all length and diameter.

Tuning over 14 and 28 Mc. with the same coil requires about a 2 to 1 capacitance range. Allowing for tube capacitances and strays, it is unlikely that the actual capacitance at 28 Mc. will be less than 20 to 30 $\mu\text{fd.}$, even with the coil adjusted so that the circuit is resonant with the condenser close to minimum. Hence even if the coil is carefully pruned it is unlikely that a condenser having a maximum capacitance of less than 50 $\mu\text{fd.}$ will cover both bands. It would be safer to use 75 or 100 $\mu\text{fd.}$, in the event that the most convenient way to get on 21 is to use a single coil for two bands. The same considerations hold if the stage is to cover the 14- and 21-Mc. bands instead of 21-28; the required capacitance ratio is a little over 2 to 1 but 75 to 100 $\mu\text{fd.}$ should be enough maximum condenser capacitance.

The amplifier circuits following the tripler may already have enough tank capacitance

*Technical Editor, *QST*.

range to hit 21 Mc. with a 28-Mc. tank coil, requiring nothing more than retuning to get on the band. This is the quickest way, although it may lead to pretty high C in the tank circuit at 21 Mc. and thus may lower the tank efficiency somewhat. If the coils are plug-in, or if an extra one can be switched into the circuit, it will in general be satisfactory to figure on using the same in-use capacitance at 21 as at 28 Mc., because on the latter band it is rarely possible to get a low- C circuit. Hence the coil for 21 Mc. should have about twice the inductance of the 28-Mc. coil; that is, 40 per cent more turns in the same space.

It isn't a bad idea to have a wavemeter or grid-dip meter handy to check the tuning of the circuits. A lot of fellows have got on 21 by the accident of picking the wrong harmonic (sometimes not realizing it until FCC cooperated by advising them) and the same thing can happen in reverse. Once we get the band this isn't too likely to result in pink tickets, since the probability is that you will land on either 14 or 28 in trying to get on 21; still, there is very little random cross-band operation and you may find it difficult to get any QSOs.

Incidentally, in tripling from 7 Mc. the range 21,000-21,450 kc. is covered by a 7-Mc. fundamental range of 7000-7150 kc.

Antennas

If you already have a multiband antenna system using tuned feeders you're all set for 21 Mc. On this band a quarter wavelength along air-insulated line is close to $11\frac{1}{2}$ feet, so the tuning will change from series to parallel at about $11\frac{1}{2}$ -foot intervals. It may not be possible to figure very closely in predicting which type of tuning to use because with fairly long antennas the end effects prevent the resonances from falling in exact harmonic relationship with the fundamental. The simplest thing is to try both types of tuning and see which gives the best coupling to the transmitter. If neither works well, change the feeder length by about five feet and try again. When one or the other method shows signs of working, a final pruning should give the kind of coupling you want. These small changes should have little or no effect on the operation at lower frequencies, although they may cause the condenser settings to change somewhat. Changing the line length is likely to have its greatest effect on 28-Mc. operation, so it may turn out that a compromise (involving only a few feet of line at most) may be desirable for optimum operation on both bands.

Fig. 1 gives dimensions for ordinary and folded dipoles for 21 Mc., in case a special antenna is put up for this band. The recommended lengths are for the center of the band. Air-insulated line should be used for the straight dipole, and the line length preferably should be some multiple of $11\frac{1}{2}$ feet. Odd multiples will require parallel tuning and even multiples will take series tuning.

The 300-ohm line to the folded dipole can of course have any convenient length since it will

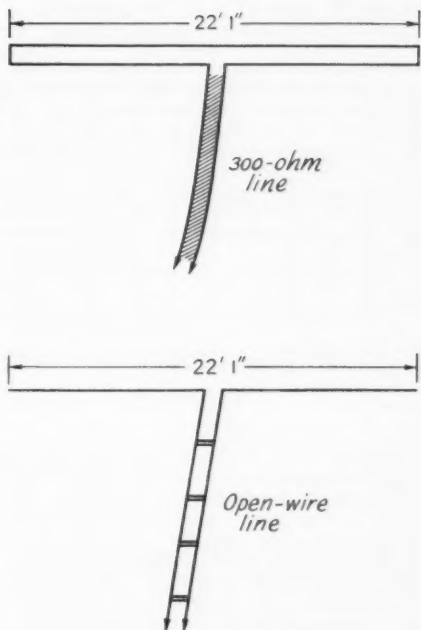


Fig. 1—Dimensions for 21-Mc. dipole antennas. Other types are discussed in the text.

be fairly closely matched to the antenna. The customary methods of coupling the transmitter can be used; if a parallel-tuned coax-coupled "antenna tuner" is employed the tuned circuit must of course be capable of resonating at 21 Mc. In the coupler unit shown in the transmission-line chapter of the *Handbook* the same coil that covers 28 Mc. also will cover 21, although for matching purposes a separate coil may be desirable in that the line taps may not come at the same points on both bands.

Beams for 21 Mc. can be constructed on the basis of scaling existing designs for other bands. All dimensions will be inversely proportional to frequency, so 28-Mc. dimensions can be multiplied by $4/3$ to get measurements for a 21-Mc. beam, and 14-Mc. dimensions may be multiplied by $3/2$. These are "round" figures, and in view of the limited frequency range of some beams, particularly the close-spaced variety, exact frequencies should be used. For example, if the beam is to be cut for 21.2 Mc. and is based on an existing design that has been cut for 28.7, the ratio of all dimensions is $28.7/21.2 = 1.353$. Or, if the same frequency is to be scaled down from a beam now centered on 14.25 Mc., the ratio is $14.25/21.2 = 0.672$. The bandwidth can be expected to be proportional to frequency, and so will be $3/4$ the 10-meter bandwidth or 1.5 times the 20-meter bandwidth.

The 21-Mc. band opens a new, although somewhat specialized, antenna possibility, in

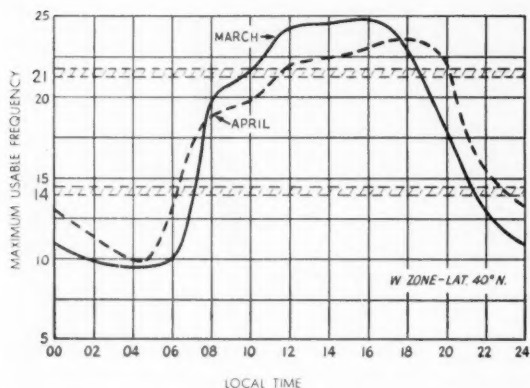


Fig. 2—CRPL-predicted m.u.f. at 40 degrees N. latitude in the W zone. Solid line is the prediction for March, 1952; broken line is the prediction for April.

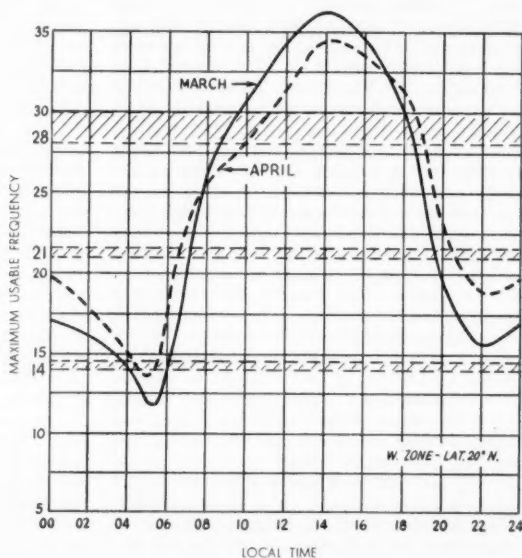
that some matched systems may work well on their odd harmonics. For example, a 7-Mc. folded dipole will be reasonably well matched to 300-ohm line when operated on the third harmonic. The fact that the harmonic relationship is not exact introduces a bit of difficulty and may require careful adjustment of length. For example, the writer measured the standing-wave ratio on an Amphenol folded dipole cut for a center frequency of 7100 kc., at which frequency the s.w.r. was 1.15 to 1 under the conditions of installation. At 21.3 Mc., the exact third harmonic, the s.w.r. was 4.4 to 1, but at 22.2 Mc. it reached its lowest value of 1.7 to 1. This latter frequency is the resonant frequency of the antenna based on the long-wire formula in the *Handbook*. Over a 450-kc. band centered on 22.2

the s.w.r. did not exceed 2 to 1. Making the antenna the right length to center the "third harmonic" in the 21-Mc. band would give satisfactory operation in this band at the expense of a somewhat increased s.w.r. at the high end of 7 Mc., but still without exceeding 2 to 1 anywhere in the latter band. The length required is about 68.5 feet.

Propagation — 1952

Of considerable interest, naturally, is the question of what kind of propagation we can expect when the band is finally opened to us. On present sunspot-cycle forecasts, the next couple of years are likely to be the poorest, in terms of number of hours per day that the band will be open. At this writing the CRPL forecasts for March and

Fig. 3—Similar to Fig. 2, but for 20 degrees N. latitude, W zone. In both charts, a band is expected to support communication by reflection from the ionosphere at the latitude given, whenever the curve is above the frequency under consideration.



April are the latest available, and Figs. 2 and 3 give some indication of what is to be expected during those months. Fig. 2 shows the predictions for 40 degrees N. latitude in the United States and is representative of the average conditions for the country. The curves show the predicted 4000-km. m.u.f. directly overhead at that latitude, and the band should be open whenever the curves are above the 21-Mc. line. The times have to be shifted an hour or so, depending on the distance, for east-west transmission since the reflection point is not overhead in actual long-distance communication but lies up to 2000 km. from the station.

Fig. 3 is a similar prediction for 20 degrees N. latitude in the United States. It is representative of the southern part of the country for east-west transmission, and also indicates in a general way what the band will be like for working south from about 40 degrees N. latitude. It is easy to see that rather good conditions can be expected in the direction of South America for a considerable portion of each day. The 28-Mc. band is expected to open in this direction as well.

These two charts give only a small glimpse of the over-all propagation picture but do show that even though we are approaching a sunspot minimum we can expect to get considerable immediate use out of the band. For the present, working Europe regularly from the middle and upper U. S. latitudes is not to be expected, but signal paths lying below an east-west line should produce contacts over most of the daylight hours. The nearer you are to the southern border the better your chances of getting out in all directions at some time of the day.

Strays

A corona "sniffer," designed for use in the examination of large motors and generators, has been developed by General Electric. "Capable of distinguishing corona on adjacent coils of a large machine," this might have possibilities as a test unit among the high-power gang!

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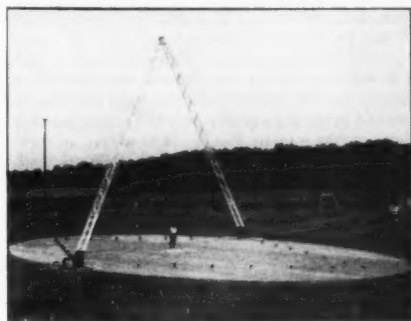
The *International Projectionist and Independent*, organ of IATSE, has published a list of W and VE amateurs who are professionally employed as movie projectionists or stage hands. A limited number of copies is still available. Those interested may write Amos Kanaga, W6BAA, 262 La Casa Avenue, San Mateo, Calif.

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No constructor or experimenter in the amateur field should be unfamiliar with components bearing the Cardwell trademark. We note with regret the passing of Allen D. Cardwell, founder of the manufacturing concern bearing his name and otherwise a contributor to the art. In retirement, Mr. Cardwell had been working on pilot models of physical-therapy equipment to be used in the rehabilitation of disabled veterans.

Bureau of Standards Model Antenna Range

A NEW model antenna range, shown in the photograph below, has recently been completed by the National Bureau of Standards at its Radio Propagation station at Sterling, Va. Its primary purpose is to facilitate the measurement of antenna radiation patterns in the vertical plane. The inverted-"V" type plywood structure, capable of 180-degree movement, supports a target transmitter at its vertex some 50 feet above the metal hardware-cloth ground plane. The antenna model to be tested is placed in the center of the plane. The model test antenna, which by the law of reciprocity has identical radiation and reception patterns, intercepts target-transmitter energy which is then rectified and transmitted along underground cables to a recording pen attached



A view of the NBS antenna range with the target transmitter raised to the 90-degree position.

to an automatic pattern plotter. Particular care has been taken to prevent stray reflections within the field.

These antenna investigations are mainly concerned with the high-frequency spectrum from 3 to 30 Mc. at which frequencies the wavelength varies from 300 to 30 feet. Measurement of full-sized antenna performance would require a site several thousand feet long whereas a prototype frequency may here be represented by model-transmitter frequencies from 60 to 1500 Mc. This employment of model techniques ("electrodynamic similitude") eliminates the necessity of full-scale work with attendant complexities such as free-flight balloons and aircraft. This NBS unit is believed to be the largest ever designed for its purpose.

For an example of amateur work along this line we refer readers to "Parasitic-Array Patterns" by Joseph L. Gilson, W3GAU, in the March, 1949, *QST*.

**SWITCH
TO SAFETY!**



A Power Supply for the Novice Transmitter

A Practical Unit and Some Hints for the Beginner

BY RICHARD M. SMITH,* W1FTX

THE first thing anyone should learn about a power supply is that it is a lethal instrument, capable of killing or injuring without warning. It should, therefore, be handled with extreme caution. Forming good habits in this respect right at the start is important, and will help you live to a ripe old age. We don't want any Novice calls appearing in "Silent Keys"! More about the safety angle later; right now, we want to get to the subject at hand.

Following the appearance in *QST* of instructions for converting a Command transmitter for use by Novice licensees,¹ we received many inquiries concerning the design and construction of a suitable power supply for the unit. This opened up the whole question, and eventually resulted in the supply shown in the accompanying photographs and in Fig. 1. It is about as inexpensive as any supply having comparable output, and will serve to introduce the Novice to some of the things he needs to know.

The supply shown is designed expressly for use with the "Command" transmitter, but its output ratings are such that it can be used with many other c.w. transmitters. It delivers 425 volts at 150 ma. for the amplifier plate, 250 to 300 volts at about 18 ma. for the amplifier screen-grids, and 255 volts (regulated) at 25 ma. for the oscillator. In addition, it furnishes 12.6 volts a.c. at 3 amp. for the filaments. If desired, the filament circuit can be rewired to provide 6.3 volts at 6 amperes. A single "replacement-type" transformer is used to provide all output voltages. Admittedly, this is not the most convenient arrangement, because it requires that the high-voltage and filament circuits be turned on at the same time. To get around this disadvantage, a ceramic switch having sufficient insulation to withstand the high voltage is used

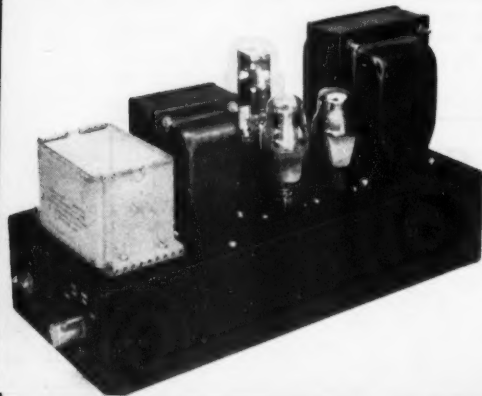
• To old hands, power supply seems like a "cut and dry" topic, but to the Novice it is apt to be just as big a question mark as any other part of radio. This article, without going into the theoretical side of power supply design, points out some of the things a Novice should know about his power unit.

to turn the plate supply voltages on and off separately. It works out to be a little less expensive this way, because the price of the ceramic switch is less than the cost of the two separate filament transformers that would be required otherwise.

The high-voltage winding of the transformer specified is rated for 600 volts a.c. each side of the center tap. Its current rating is 200 ma. In addition, it has three separate filament windings, one rated at 5 volts, 3 amperes to handle the rectifier, and two rated at 6.3 volts, 3 amperes. To obtain the 12.6 volts needed for the transmitter filaments, the two 6.3-volt windings are connected in series so that their voltages add.

How the single high-voltage winding of the transformer is used to supply three different d.c. potentials is shown in Fig. 1, and is explained below. It is suggested that the Novice make reference to the Power Supply chapter of any recent edition of *The Radio Amateur's Handbook* for the information he will need to understand the terminology used in the following paragraphs.

Before the output of the rectifier is split into the various d.c. output levels required by the transmitter, it must be filtered to remove the high ripple content resulting from rectification of the a.c. This is accomplished by the simple single-section, choke-input filter comprising L_1 and C_1 . In addition to providing the degree of filtering needed for a c.w. transmitter, the circuit has quite a bit to do with the degree of voltage

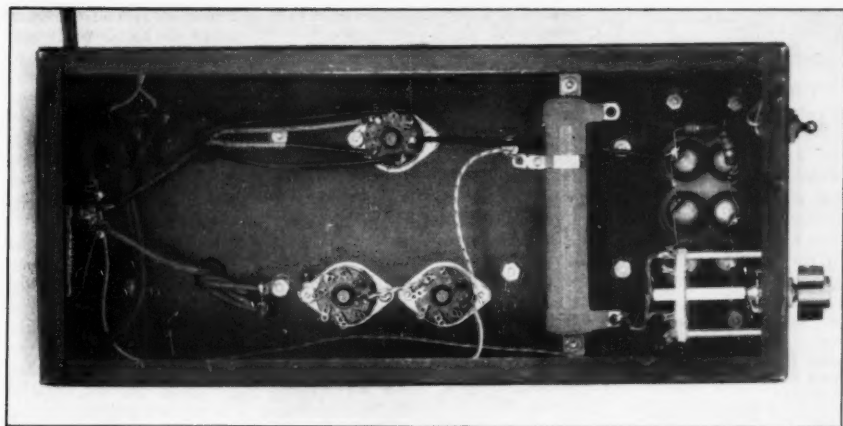


This view shows the arrangement of the components on the chassis. The filter condenser is at the left next to the filter choke. The tubes are grouped near the center of the chassis, with the transformer at the right. The a.c. switch and the rotary switch used for tune-up and transmit-stand-by purposes are mounted at one end of the chassis so that it may be placed beside the transmitter without "hogging" too much space on the operating desk.

QST for

* Technical Assistant, *QST*.

¹ Bradley and Smith, "The Novice Conversion of a 'Command' Transmitter," *QST*, November, 1951.



There isn't very much in the way of wiring inside the chassis. In this view, the leads from the transformer can be seen coming through the chassis near the left side of the picture, the tube sockets are in the center, and the filter condenser and the switches near the right. The large resistor is the current-limiting resistor for the VR tubes. The output terminals make use of a 5-prong tube socket which can be seen at the left. Screen resistor, R_4 , is mounted between two of the terminals of the output socket.

regulation obtained. Use of choke input restricts the rise in voltage that always occurs when the load is removed from the supply, as it is whenever the key is opened. Thus, the components used in the filter serve the dual purpose of removing most of the ripple content, and preventing the output voltage from rising excessively under no-load conditions. It should be remembered that less filtering is required in a crystal-controlled c.w. transmitter than in either a VFO or a 'phone rig. We have used the minimum required to keep the cost of the unit low.

Another factor affecting the degree of regulation obtained in a given power supply is the amount of current passed by the bleeder resistor. This, of course, is a constant load on the supply, tending to hold the output voltage down when the external load is removed. In addition, it serves the very important purpose of discharging the filter condenser after the supply is turned off. In the usual supply, the size of the bleeder resistor required for good voltage regulation is determined by the inductance of the filter choke. Here, however, we have an additional constant load across the output of the filter in the form of the VR tubes used to provide the oscillator plate voltage. The current through the VR tubes is great enough to take care of the regulation aspects of the problem so it is merely necessary to provide a discharge path for the condenser to protect the operator. This resistance, which is made of R_1 plus R_2 , is much higher than normal, and for that reason low-cost carbon units can be used.

It might seem like duplication to provide more than just the VR tubes as a discharge path, but actually it isn't, because the VR tubes stop conducting after the voltage falls below a given point. After the VR tubes drop out of the picture, the resistors continue to discharge C_1 until the

voltage falls to harmless proportions. Note that R_1 and R_2 are always connected across the filter regardless of the position of S_2 . This is the only safe place for the protective bleeder, because if it was disconnected by the switching, the discharge path would no longer be in the circuit.

Because the output voltage is considerably higher than that allowed by the ratings of the oscillator tube, some means must be provided to reduce it to about 250 volts before it is applied to the tubes. A dropping resistor could be used, but this method is undesirable where an oscillator is concerned because when the tube is not drawing current (when the key is open, for example), there is no voltage drop through the resistor, and the voltage appearing at the plate of the oscillator tube soars up to the full supply voltage.

We chose a better way to do it, using voltage regulator tubes. They are made in 75-, 90-, 105- and 150-volt types, and two or more may be connected in series to produce a variety of combinations. Thus, by using a VR-105 in series with a VR-150, as shown in Fig. 1, we get what amounts to a regulator for 255 volts. There is, of course, a limit to the amount of current that can be drawn from a regulated supply using VR tubes. The maximum load current that can be handled is determined by the initial regulation of the supply. This is because it is necessary to use a resistor, R_3 , in series with the VR tubes to limit the current flowing through them to the rated value of 30 ma. The higher the initial voltage, the larger the resistor must be. In general, the poorer the regulation of the supply to start with, the smaller the load current that can be regulated.

In the present case it is not possible to regulate both the oscillator plate voltage and the amplifier screen voltage because of the limiting factors discussed above. For that reason, the 255-volt output is used on the oscillator plate alone, and

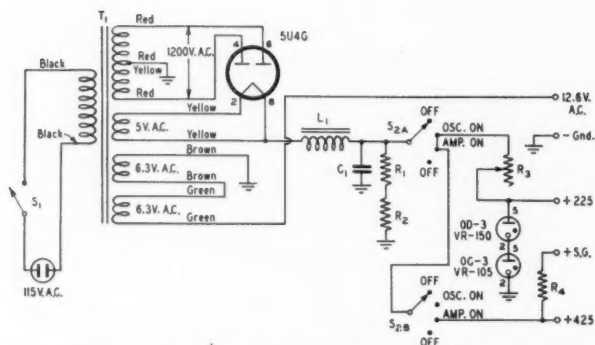


Fig. 1—Schematic diagram of a power supply designed for use by the Novice with the "Command" transmitter.

- C1—2- μ f. 1000-volt paper.*
- R1, R2—68,000 ohms, 1 watt.
- R3—10,000 ohms, 50 watts, with slider.
- R4—10,000 ohms, 10 watts.
- L1—10 henrys, 200 ma., 140 ohms (Merit C-3181).*
- S1—Single-pole single-throw toggle switch.
- S2—2 poles, 2 to 5 positions, ceramic (Centralab 2505).
- T1—Replacement-type power transformer, 600 v. a.c. each side of center tap at 200 ma., 5 v. a.c. at 3 amp., 6.3 v. at 3 amp. (2 windings) (Stancor PC-8414 or Stancor P-6170).

* Values may be changed; see text.

a dropping resistor, R_4 , is used to obtain the 250 to 300 volts needed by the screens. Use of the dropping resistor is permissible here, whereas it was not in the case of the oscillator, because even though the screen voltage rises to the full supply voltage when the key is opened, it does not exceed the breakdown rating of the 1625s, nor does it reduce the frequency stability of the signal.

As a matter of operating convenience, a switch is provided to remove the d.c. supply voltages while leaving the filament and heater voltages applied. This switch, S_2 , is a double-pole ceramic wafer capable of withstanding the full supply voltage. The wiring to the switch is arranged so that with the knob turned fully counterclockwise, all d.c. voltages are removed from the output terminals. Turning the switch one position clockwise applies the oscillator voltage alone so that the oscillator may be tuned to resonance and adjusted for best keying before the amplifier is turned on. The third position brings both oscillator and amplifier voltages on, and is the position used for transmitting. The fourth position removes both oscillator and amplifier voltages at once. Thus, in operation, the switch is merely turned from Position 3 to Position 4 to turn the transmitter off after a transmission, returning to Position 3 when you want to transmit again.

Construction and Adjustment

The general layout of parts is shown in the photographs of the unit. In power supply construction it is permissible to let operating convenience and mechanical considerations determine the layout, because lead length is of small

importance. You can rearrange the layout to fit your own circumstances if you like, and the result will still be the same. Adequate insulation must be provided, of course, but in many instances this is already taken care of by the construction of the components themselves.

As shown in the bottom view, the wiring is not complex. The only components mounted beneath the chassis are the switches, and the resistors. The bleeder res-

istance is made of two 1-watt resistors in series, and is connected right across the terminals of the filter condenser. The current limiting resistor, R_3 , is mounted across the bottom of the chassis on the mounting feet supplied with the resistor. Screen resistor R_4 is mounted on the inside of the power output socket, which is a 5-prong tube socket. A 3-terminal tie point is mounted near the primary leads of the transformer for connection of S_1 , and a 2-terminal tie point is used to provide a junction point for the series-connected filament wires.

The wires from the transformer pass through the chassis in half-inch holes lined with rubber grommets to prevent the sharp edges from chafing through the insulation. A similar hole is used to bring the leads from the filter choke through the chassis.

After completing the wiring, check it thoroughly against the schematic diagram to make sure that it has been done correctly. It is then only necessary to set the sliding contact on R_3 to the proper position before the supply can be used. Connect the transmitter to the supply before starting this adjustment. Before turning the supply on for the first time, set the slider on R_3 about three-fourths of the way down from the end that is connected to S_2 . Don't clamp the slider too tightly or you may damage the fine wire used in the resistor. Just turn the screw enough to hold the slider in position. Now disconnect Pin 2 of the VR-105 from ground, and connect a d.c. milliammeter between Pin 2 and ground. The plus side of the meter should go to Pin 2, and the minus side to ground. The meter should be capable of reading at least 100 ma.

Set S_2 to its extreme counterclockwise (off) position, and then turn S_1 on. This applies power to the primary of the transformer and allows the filaments in both the supply and the transmitter to warm up. After a few seconds, turn S_2 to the "OSC. ON" position. Make sure that the key of the transmitter is open, and then note the reading of the milliammeter that is connected in series with the VR tubes. If it reads more than 30 ma., turn the supply off. If it reads 30 ma. or less, close the transmitter key, and notice whether the VR tubes stop glowing. If they do, tune the

oscillator to make sure that it is functioning. If the oscillator is working and the VR tubes continue to glow, the slider is already set to the correct position, and no further adjustment is needed. If adjustment is needed, one of two things will happen. First, if the meter shows that the VR tubes are passing more than 30 ma., more resistance must be added to the limiting resistor. If it shows less than 30 ma., yet the VR tubes do not continue to glow when the key is closed, less resistance is called for. It is normal for the VR tubes to glow more brightly when the key is open than when it is closed, but they must remain aglow under both conditions if they are to do their job properly.

If you find that adjustment is needed, and you probably will, don't just grab your screwdriver and start moving the slider. You won't get very far, because you'll get a serious shock. Turn the a.c. switch, S_1 , OFF. Then take an insulated screwdriver, place the blade against a good ground point on the chassis near the ungrounded side of the filter condenser, and then tip the shaft until it touches both ground and the condenser at the same time. No, don't ever rely on the bleeder in any power supply to discharge the filter condensers. Always ground the high-voltage first. If the bleeder has done its job, nothing will happen, but if the bleeder happens to have become disconnected, or is faulty, there will be a loud smack as the stored-up energy in the condenser discharges. It is a much nicer sound than that of a falling body, so pay heed, and always short the high-voltage to ground first.

Once you are sure that the filter condensers have been discharged, readjust the position of the slider until all of the conditions mentioned above are met, namely, that the VR tubes draw less than 30 ma., and that they glow whether the key be open or closed. Sometimes you have to look pretty closely to see the faint glow down inside the tubes, but as long as it is there, the circuit is working properly. Now you can apply the high voltage to the amplifier tubes and get the rig on the air. It may be necessary to make further readjustment of the slider on R_3 to compensate for the slight reduction in plate voltage that takes place when the amplifier stage is heavily loaded, but it should be a simple matter once the approximate setting is found.

A word now about parts substitution in this supply. There are not too many transformers listed in the regular catalogs that will do the job that the one shown can do. If, however, you want to use a different transformer, the same circuit arrangement can be used, provided that the proper filament voltages are obtainable. It is sometimes possible to series-connect a 5-volt filament winding and a 6.3-volt winding to obtain 11.3 volts for the filaments of the transmitter tubes. They will work on this voltage, but tube life may be reduced somewhat because the cathodes will not be operating at high enough temperature. You cannot do this with any 5-volt winding that is used to operate a filament-type recti-

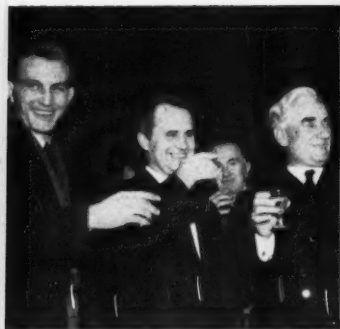
fier, because the entire filament circuit would then have the high voltage on it.

The choke and condenser combination used in the supply as illustrated can be replaced with other units if desired. Just make sure that the combination you choose will serve to reduce the ripple percentage to 5 per cent or less. This can be determined from a chart appearing in the *Handbook*. Use the chart applicable to single-section, choke-input filters. It will tell you how much C is required in conjunction with a given inductance to reduce the ripple to 5 per cent. For example, with a choke of 10 henrys, only 2 μ fd. is required to get down to the 5 per cent level, but with a 5-hy. choke, 4 μ fd. is required. In selecting the choke, pay attention to the current rating, the inductance, the d.c. resistance, and the voltage it is insulated to withstand. Making a choke handle more than rated current is bad from two viewpoints. First, the wire with which it is wound may be overheated, resulting in an eventual insulation breakdown. Of even greater importance is the fact that the more current a choke passes, the lower its inductance becomes. Thus, if overloaded, the inductance may fall below that needed to do a good job of filtering. The d.c. resistance is of importance only as one of the numerous factors influencing the voltage regulation obtainable from the supply. The higher the d.c. resistance, the greater the voltage drop when current is passed through the choke, and therefore the poorer the regulation of the supply.

It does not pay to skimp on filter condensers in either quantity or quality. We've specified 1000-volt paper condensers for this unit, primarily because they will last indefinitely if operated below ratings. You could substitute electrolytic condensers, which are apt to be less expensive. Be sure, however, that they are rated to stand at least 750 volts, because when S_2 is turned off the voltage read from the junction of L_1 and C_1 to ground is 700 volts. When S_2 is turned to "OSC. ON," the load presented by the current through the VR tubes causes the voltage at this point to fall to 500, and when the supply is delivering full load to the transmitter it drops to about 440.

If the supply is used with the "Command" transmitter, as a final check, measure the screen voltage applied to the 1625s. This must be done with the transmitter in full operation delivering power into a load. Any voltage between 250 and 300 will be satisfactory, but the closer to 300 the better. If it is much lower, it will be difficult to load the transmitter to full output. If screen voltage is too low, check the plate loading of the amplifier stage. Insufficient loading causes screen-grid current to be greater than normal, resulting in a greater voltage drop through R_4 . If screen voltage is too high, increase the value of R_4 to about 12,000 ohms, and make the measurement again.

If the supply is used with some other transmitter, the value of R_4 should be changed to correspond to the correct value for the tube (or tubes) used in the transmitter.



INP photo



N. Y. Daily Mirror-INP photo



QST Visits "Captain Stay-Put"

A Day with W2ZXM/MM

This is a story about an amateur you all know.

Captain Henrik Kurt Carlsen, master of the *Flying Enterprise* . . . "Captain Stay-Put" . . . welcomed at Falmouth by admiring throngs . . . given an ovation at a press conference by 300 news and radio men . . . knighted by the King of Denmark . . . awarded the highest medal given a seaman — Lloyd's Silver Medal . . . acclaimed with a thunderous ovation and ticker tape parade by the City of New York . . . reunited at last with his family at their home in Woodbridge, N. J.

And through it all, the man never changed. When we arranged with Isbrandtsen Line officials to obtain an interview, the Captain willing, little did we expect the warm reception he gave us at his modest home . . . the hospitable welcome from Mrs. Carlsen . . . the hot coffee and cake after the long drive from Connecticut . . . the QSO with W2ZXM from the mobile rig. We came for an hour — the Captain insisted we stay for the day.

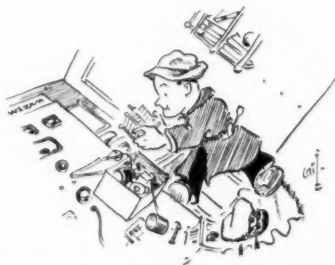


SITTING in his favorite easy chair, Captain Carlsen ("I'm Kurt to my ham friends") told how an amateur radio operator can meet and conquer a communications emergency. Said W2ZXM, with a grin: "I never once considered myself in a serious spot as long as I had the radio working." And the radio Kurt had working was one born out of the emergency situation he found himself in. But let's recount the story as the Captain told it to us:

On Christmas Day, four days out of Hamburg bound for New York, Kurt sat down in his ham shack (off the Captain's cabin) to his last ten-meter QSO for many days, a contact with W0YZO in St. Louis. After that contact, with the seas running high and the wind blowing at hurricane force, he went on the bridge to remain there for 75 straight hours.

On December 28th, with the USMS *Golden Eagle* standing off the now badly-damaged *Flying Enterprise*, Captain Carlsen ordered his passengers

and crew to abandon ship. Seeing their rescue effected, Carlsen went into the radio shack (port side), the ship already badly listing to port. The big commercial rig useless, the emergency diesels unable to operate because the list tilted the fuel tanks, he switched on the ship's 50-watt battery-powered c.w. transmitter and worked the *Golden Eagle*. But Carlsen knew he could not remain in the ship's regular radio shack long — knew that the batteries would not be good for lengthy communication. In his mind he had already worked out what he would do. "Stand by," he radioed, then went into his ham shack on the starboard side. His homebuilt one-kilowatt amateur transmitter also useless, he dug out a five-watt Radiomarine transmitter purchased for a cabin cruiser his father-in-law built. But this rig was also inoperative as it was — ham ingenuity and skill had to be put to work. Raiding his ham shack junk box, Carlsen threw together an antenna tuner and erected a long wire on the deck of the ship.



W2ZXM liked to construct equipment. He had been hard at work on a push-push 807W transmitter from the *Radio Amateur's Handbook* and QST. The rig was completed except for the wiring. This rig was to be the nucleus of an emergency-powered set and, fortunately, in the ham shack were six-volt storage batteries and an emer-

gency power supply all ready to test the new transmitter. Again the ham junk box was raided and a pair of battery clips hooked to a cable. The small commercial rig was now in business.

For his contemplated emergency set, Carlsen had planned on a ham-converted ARC-5 receiver. The 24-volt dynamotor had already been re-wound to six-volt operation, and an audio stage added by his friend OZ5KP. Using this receiver operating in the 2-3 Mc. range, Carlsen tuned up the transmitter, went back to the c.w. rig and told the *Golden Eagle* to listen for him on 2738 kc. "Where in the — did you get that thing?" blurted forth from the ARC-5 'speaker, after contact had been established.

But the elements which had already smashed his beam to the deck were still against him. The long wire blew down. Again typical amateur ingenuity stepped in. Kurt clipped the line cord from his broken desk lamp, twisted the ends together, hung the whole works on an oar out the porthole and was on again. It was necessary to prune the new antenna "but it finally loaded up beautifully."

"There is no doubt in my mind," said Captain Carlsen, "that it would have been a very ticklish proposition without the ham gear."



The little emergency rig lasted until the end. As we sat in the Carlsen living room, he played recordings of the radio contacts, commenting when his voice was heard: "Doesn't the modulation on the little rig sound good?" (Mrs. Carlsen handled the record player — Kurt quipped, "I don't have a license for it!")

Throughout the entire 16 days of his ordeal his radio contacts were being recorded by many people, among them two close amateur friends, DL1SD of Hamburg and OZ5KP of Silkeborg, who relayed news to Carlsen's parents in Denmark. One British ham used up 450 feet of tape recording the transmissions.

Carlsen's only contact with humanity was via radio until Kenneth Dancy, mate of the British salvage tug *Turmoil*, jumped aboard on January 4th. Said Dancy, extending his hand, "Captain Carlsen, I presume. . . ."

Ham radio figured in another way aboard the *Flying Enterprise*. When Carlsen sailed from Hamburg, DL1SD and his XYL, DL1SM, gave him a Christmas wreath adorned with four candles in holders to brighten his cabin at the holiday season. They didn't realize then what cheer the



wreath was to bring. On the fifth day alone, Captain Carlsen related, "the urge for something hot got so terrific" that he filled a can with water from his meager supply (five cups in 16 days) and using two candles from the wreath stuck in the mattress he bunked on, brewed a cup of tea "that was really something." We asked him how long it took for the water to get hot. He grinned and replied, "Try it sometime — your arms get plenty tired."

During the period aboard ship, Kurt carried on communication with escorting vessels. One of the Naval communication officers aboard the destroyer *Keith* turned out to be a ham and a short QSO resulted.

All of you know the heartbreaking story of the final days . . . with success so near the parting of the tow line . . . the new storm . . . the death of a gallant ship. Kurt maintained radio contact to the end, the receiver still on as he and Dancy scrambled hand over hand up a rope to the cabin door above them, the ship on its side by then, the two of them actually standing on the bulkhead. The last message from the *Keith* ("Don't wait too long.") went unanswered.

When Carlsen was safely aboard the *Turmoil* he pulled out his wallet. Despite the four minutes in the water, its contents were fairly dry and legible—including his amateur ticket.

Among those waiting in Falmouth was OZ5KP. And when the train from the port city puffed into London there was Scotland Yardman G6KC among the police officers assigned to guard the skipper from the admiring crowds and inquiring reporters.

When the ship went down in 40 fathoms she carried all of the Captain's amateur and personal gear. His station was one of the best-equipped afloat. As reported last month in *QST*, the main transmitter ran one kilowatt, a bandswitching 2- to 80-meter exciter driving a pair of 813s in the final. The rig, Kurt's first transmitter con-





Captain Carlsen is presented with a *Radio Amateur's Handbook* to replace the one he lost, this one inscribed with the signatures of the ARRL Headquarters gang: Harry Paston, W1DJV, ARRL assistant secretary, Harold M. McKean, W1CEG, QST managing editor, and Edgar D. Collins, of QST's advertising department, made the presentation at the Captain's home. The latter sailed with Carlsen on two occasions.

struction project as a licensed amateur, took six months to build during his spare time aboard ship; each unit of the transmitter was individually compartmentized. ("When I think of those coils on the bottom . . .," groans Kurt.) Much other equipment and tools went down, too.

As might be imagined, his personal loss was great. You know of the many offers he has turned down. We thumbed through letters and telegrams offering fabulous sums for commercializing his story. But Kurt Carlsen has earned the respect of the world, saying "I would not be able to live with my own conscience if I were to take one penny for doing my duty." Fellow hams have been donating money to replace his equipment. We told him of this action. You could literally see the gratitude swell in his chest. But Kurt, deeply appreciative to his fellow amateurs for their gesture, feels he cannot accept any donation. You have to meet this man to appreciate his feelings; we hope you will respect his wishes.

Kurt was licensed as W2ZXM in 1949, but his interest in radio goes back to his boyhood in Denmark where he built one- and two-tube

receivers. His sea career included stints as an officer and radio operator aboard Danish ships but most of his construction experience and skill, he says, was gained after becoming interested in amateur radio.

Captain Carlsen told us that he had succeeded in catching up on most of his QSLing. An active operator, W2ZXM/MM was one of the best-known of the ten-meter 'phone signals. Sitting on his desk when disaster struck were nearly fifty QSL cards, stamped and ready to mail, confirming contacts made on the trip over to Germany. These, along with his card collection and logs, rest on the bottom of the North Atlantic.

Undaunted however, Captain Kurt says he will start over again. His new command, a faster and larger ship, especially pleases him because it already has a.c. aboard. The first maritime-mobile rig, now at the home station, will be put into shape and used again while he builds a new rig. Hans Isbrandtsen, owner of the company, has assured Captain Carlsen of a new *Flying Enterprise*; Captain Carlsen assures us of a new maritime-mobile W2ZXM. — H. P.



25 Years Ago this month

March, 1927

... Communications Manager F. E. Handy announces plans for a world-wide contact contest, an International Relay Party which will run for a two-week period in May.

... There are now 39 members on the WAC Club roster. From the U.S.S.R. we hear of some 30 transmitters in operation on amateur wavelengths.

... 2EB and 2NZ covered the 30-mile path between Jamaica and Teaneck using a wavelength of 5.19 meters. 2EB and ACD, Bologna, Italy, are reported to have heard each other's five-meter signals.

... Twenty meters is rapidly becoming thickly populated and contacts are now easily made during the week as well as on Saturdays and Sundays.

... The relative merits of grid and plate detection are examined by Sewall Cabot. The author favors the grid detector for c.w. and plate detection for 'phone.

... Glenn H. Browning and Frederick H. Drake an-

alyze tuned r.f. transformers in a mathematical and graphical presentation.

... "A Flexible Transmitter" by J. F. Marco, 9ZA, features a t.p.t.g. circuit for 20 through 160 meters using plug-in coils and the popular UX-210 tubes.

... Master oscillators and power amplifiers are treated in the fourth article of the series "How Our Tube Circuits Work" by Technical Editor Robert S. Kruse.

... Reception interference caused by industrial and domestic electrical appliances is discussed by Mr. Kruse.

... "Quartz Crystal Calibrators" by A. Crossley goes into the matter of frequency-standard equipment and oscillator circuits therefor.

... The Arizona gang favors using a very weak solution of borax in their rectifiers. According to 6BWS the danger of "creeping" is then negligible.

... 5ZU of Austin, Texas, 8AUL of Wheeling, W. Va., and Standard Frequency Station 9XL are described.

COMING A.R.R.L. CONVENTIONS

June 14th—New England Division, Springfield, Mass.
June 28th-29th—West Gulf Division, Corpus Christi, Texas

I.A.R.U. News



I.A.R.U. CALENDAR

In the December issue of the I.A.R.U. Calendar four societies are proposed for membership in the Union — the *Deutscher Amateur Radio Club*, representing Germany; the *Guayaquil Radio Club*, representing Ecuador; the *Radio Society of Bermuda*, representing Bermuda; and the *Vereeniging voor Experimenteel Radio Onderzoek in de Nederlandse Antillen*, representing the Netherlands Antilles. All of these societies are well-established groups, and their membership in the Union will do much to extend the good relations which already exist amongst radio amateurs throughout most of the civilized world.

Union Secretary Budlong reported on EARC to member-societies, with the substance of his report being covered editorially elsewhere in this issue of *QST*.

In 1951 the Headquarters of the Union issued a total of 681 WAC certificates, with 239 of these being for work done entirely by radio-telephone. In 1950 the comparable figures were 916 and 376. Twenty-eight of the special 3.5-Mc. endorsement stickers have been issued, one being for work entirely on 3.5-Mc. 'phone.

AUSTRALIA

The *Wireless Institute of Australia* is sponsoring an annual v.h.f. contest — the Ross A. Hull Memorial V.H.F. Trophy Contest — to inspire greater interest in this field of activity. The late Mr. Hull was for many years the editor of *QST*, and was a native of Melbourne, Australia. He was a prolific amateur experimenter, well-liked both in the United States and in the land of his birth, and this trophy is indeed a fitting tribute to his many contributions to the amateur v.h.f. field.

NETHERLANDS ANTILLES

Late in December the government of the Netherlands Antilles gave formal approval to amateur radio, and announced that examinations for amateur licenses would commence in January or February. At the same time it announced that the following frequencies would be available for use by its amateurs: 3520-3635, 3685-3800, 7020-7280, 14,020-14,330, 21,020-21,430, and 28,020-29,680 kc. In addition, these higher frequencies will be assigned: 50-54, 144-148, 220-225, 420-450, 1215-1300, 2300-2450, 3300-3500, 5650-5925, and 10,000-10,500 Mc. Maximum power input allowed below 29,680 kc. is 150 watts, with a limitation of 50 watts input above that frequency. There will be an examination fee equivalent to about \$13.00 U. S. funds, and a

yearly license fee of \$25.00 U. S. funds.

The Federal Communications Commission still forbids U. S. amateur communication with hams in PJ-land, since the government of the Netherlands Antilles has not yet withdrawn its formal objection to amateur radio with the International Telecommunications Union. I.A.R.U. Headquarters has kept in close touch with the officers of the Netherlands Antilles amateur radio society and is making every effort to coördinate correspondence with the I.T.U. so that the FCC ban will be lifted as soon as possible.

The progress made by the amateurs in the Netherlands Antilles is excellent, and they deserve congratulations for the success of their long struggle to secure government recognition and approval. This achievement on the part of the PJ hams was indeed one of the high spots of international amateur radio in 1951.

VISITORS AT UNION HEADQUARTERS

During the past year the Headquarters was honored by visits from the following overseas hams: CM2AC, CM9AA/FG7XA, G3DKS, G5WI, DL7AF, HC2JR (president of the Ecuador society), HP1AW, HB9AW/FP8AW, HB9P (president of the Swiss society), LU3BAC (treasurer of the Argentine society), TA3GVU, VS1AY, VS2CQ, and XE1AC. In each case a mutual exchange of ideas and information resulted, further strengthening I.A.R.U.'s bonds of friendship and cooperation. The Headquarters extends a cordial invitation to all amateurs to pay us a visit in West Hartford when visiting the United States.

ARGENTINA

On October 21, 1951, the *Radio Club Argentino* celebrated its 30th anniversary, with I.A.R.U.'s president Bailey sending a cable of congratulations on behalf of the Union. We know that all members join with the Headquarters in extending to the *Radio Club Argentino* best wishes for continued success.

QSL BUREAU CHANGES

The following address changes should be made to the list carried in the December issue of *QST*.

Greenland: Amateur Radio Station, APO 858, % Postmaster, New York, N. Y.

Guam: KG6HF, P. O. Box 100, Agaña, Guam, Marianas Islands

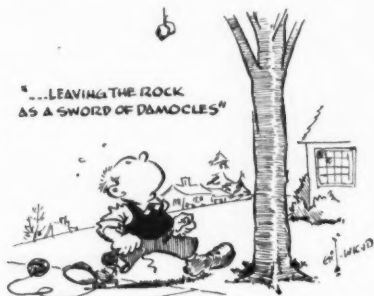
Southern Rhodesia: Box 2377, Salisbury

Sweden: SSA, Stockholm 4

Some Simple Ways of Erecting Temporary and Semi-Permanent Antennas

BY RICHARD SILBERSTEIN,* W3JQB

THE amateur who loves the wide open spaces (and who also loves ham radio to the extent that he must serve both masters when on a vacation trip) requires a simple means of erecting a temporary antenna. The same is true of the Field Day enthusiast, and a similar requirement exists for the unathletic urban or suburban ham who wants a good antenna without risking hide to get it.



Brute Force

A method used in the past in some branches of the armed forces for erecting antennas in trees was to whirl and pitch a heavy metal slug attached to a line. Heights of 60 feet were claimed for the method. The one advantage of the method is that the heavy slug can crash through places where lighter objects might become "hung up." However, the slug can also crash through the neighbors' windows, and if it does become hung up it is a perpetual menace to passers-by. The disadvantages of this method are shared by companion techniques from the elegant rod-and-reel to the lowly rock-on-a-string.

Incidentally, the process of an object tied to a line getting hung up on the branch of a tree is a graphic, if bitter, lesson in an important physical principle — the conservation of energy. It may be explained by assuming that the reader has tied a rock (or a chassis punch) to a string and has just succeeded in heaving it over the wrong branch. If the string is short enough that the rock does not touch the ground (assuming the other end of the string is held), the rock will swing like a pendulum pivoted on the branch, and the height of swing will be dependent upon the amount of kinetic energy stored in the object. If the reader now attempts to withdraw the line supporting the rock he will begin to shorten the pendulum arm. The kinetic energy will remain

fairly constant, so the rock will begin to swing with increasingly greater amplitude of swinging arc. If the withdrawal is continued at a rapid enough rate (which is altogether too easy to achieve) the rock will do one of two things: If some lateral swing is present, it will wrap itself around the line leading up to the branch but, in the worst case, even without lateral motion, it will wrap itself completely around the branch several times. In this situation, further attempts to retrieve the rock yield only a broken line, leaving the rock as a sword of Damocles.

Experiences (culminating in the use of Fire Department facilities to render a certain sidewalk free of overhead menaces to innocent pedestrians) have convinced the writer that rocks or other objects on the ends of lines used for erecting antennas in civilized communities should always be light enough so as not to become a public menace if they choose to remain in a tree. Also, the type of line used should be such as to permit the object to coast down of its own weight. For instance, a light rock on a heavy string, if thrown so as to fall with just a few feet of string on the far side of a branch, might not be heavy enough to come down of its own weight, since it has to drag the whole weight of the string and overcome friction where the string runs over the branches.

In portable operation, where it is desirable to carry all the equipment in a suitcase, a rubber ball is a convenient and safe object for throwing. An inexpensive line can be made of button-and-carpet thread. Before throwing the ball or other



object, the thread should be laced back and forth on the ground along the line of throw. It should be laid out in a large number of short lengths rather than in a small number of long lengths so as to lessen the throwing error caused by frictional drag.

Roof tops and chimneys are also convenient objects over which to throw lines, although no

*3118 Legation St., N. W., Washington 15, D. C.

strong pull should be exerted on a chimney. The thread may be followed by a heavy cord for a temporary antenna support. Nylon cord, although very strong, has great affinity for small irregularities and crevices in branches when carrying any load and may be, in general, difficult to handle. With the ball and thread, heights of the order of 35 feet may easily be achieved by the average white-collar worker.

Other Methods

Frequently, it may be desirable to take full advantage of what nature has to offer in the way of altitude, the portability of the gear for erecting and securing the antenna being of only secondary consideration. For these cases the use of a bow and arrow is strongly recommended, since heights of 80 to 100 feet can be readily attained.

Bows are rated in the number of pounds pull at the maximum allowable draw, which is 26 inches for a large range of bows. The heaviest bows have a rating of the order of 65 pounds and, for the ham who is not expert in climbing but is otherwise possessed of physical strength, affords the maximum in height attainment. The author, being of slight stature, found that even after practice, which affords remarkable improvement in skill here as in other activities, a 28-pound bow represented about the heaviest he could nock (string) and draw. Another point is that the lighter bows exert a lighter strain on the potential user's purse.

The use of lighter bows requires the use of lighter arrows and lines. This, however, is in keeping with safety requirements, since arrows have a way of remaining lodged in dense foliage, even when shot by a skilled archer. The arrows used by the author are $\frac{3}{8}$ -inch dowel sticks 26 inches long. A deep notch is sawed and filed into one end for the bow string and at one side toward that end the dowel is notched deeply with a knife for rapid fastening of the line. It was found that with the very light line to be described, "tail feathers" were required to keep the arrow from tumbling in flight. The tail assembly consists of three fins fashioned from Scotch tape and folded so that both sides of the fin are smooth. They are arranged so that each fin rises from the surface of the arrow shaft and extends back at an angle for about two inches.

An arrow as light as the one described must carry a very light, smooth line, because of the requirement that the arrow, like other objects used for carrying lines, be capable of pulling the line over a branch when the section of the line between the arrow and the branch is very short. At the same time the line must be strong enough to carry a heavier line without breaking, since in the next operation it will be used to pull over a heavier line. These requirements are met very nicely by Size A nylon thread at the low cost of 5

cents for a 40-yard spool at any of a million different notions counters throughout the United States.

It was found that spreading the nylon thread on the ground was poor practice because of its tendency to snag on small irregularities and to pick up objects. The solution was to construct an open-sided reel by driving eight equally-spaced nails completely through a 1-inch board in a 4-inch diameter circle. The thread is wound onto this reel, the nails are pointed in the direction in which the shot is to be made and when the arrow is released the line plays off the open side of the reel. After a shot has been made in which the line falls over the desired spot, such as a particular limb of a tree, it is necessary to draw several successively heavier lines over the limb before the final antenna support is reached. The author followed the nylon thread by a button-and-carpet thread that was then used to pull over a length of packaging twine about $\frac{1}{8}$ inch in diameter. This was then followed by a $\frac{1}{2}$ -inch Manila rope. It is often of advantage to follow the Manila rope by a short length of galvanized wire, to take most of the wear caused by the swaying of the limbs.¹



In passing from one diameter of line to the next heavier in dragging the lines over one or more limbs of a tree a smooth, gradual joint is essential. Again, our old friend, Scotch tape, comes to the rescue, being used over the knotted joints. If the job is done during a rainstorm it may fail if the tape becomes soaked. Some brands of cellulose tape are worse than others in this regard.

The joint between the $\frac{1}{2}$ -inch rope and the wire is the most difficult to make. To protect the rope from direct contact with the wire, an eyelet known in the hardware trade as a "thimble" may be used. Of course, the best way to secure the rope around the thimble is to interweave the end with the section of rope just ahead of the thimble, as the mariners do. However, most hams lack the time available to sailors on a long, uneventful voyage, so it is recommended that the end of the rope be brought around the thimble and back about a foot along the approaching length of rope, the two being lashed together rightly along their whole length by a continuous wrap of antenna wire.

(Continued on page 114)

¹ Tree lovers are very unhappy at the thought of a wire biting into the limb of a tree, and not without reason. If the wire is to remain over the branch for any length of time, some provision should be made to avoid "biting" into the limb. — E4.

50 Watts Output on Ten and Six

A Bandswitched Transmitter Using the New 6146

BY RICHARD M. SMITH,* W1FTX

As time goes by, tube designers continue to make it easier and less expensive to build efficient v.h.f. transmitters. Not too many years ago it was considered something of an accomplishment to generate a few watts at 28 Mc., and it was, too, considering the tubes that were available. With the newer tubes, however, the job has been simplified greatly, and now it is no more difficult to build a rig for the 6-meter band than it is to make one for use at "eighty."

For example, the newly-announced 6146, a low-drive tetrode for use at frequencies up to 175 Mc., when used in conjunction with the 5763, which has been with us only a couple of years, makes an ideal tube line-up for a 10- and 6-meter transmitter in the popular 50-watt output power classification. Operating well within its ratings, the 6146 can produce 50 watts output in these bands, and the 5763 is capable of delivering more than enough power for its modest drive requirements. The transmitter described below makes use of these tubes in a bandswitching unit that is simple to build and efficient in operation.

The Circuit

Circuitwise, as shown in Fig. 1, the transmitter resembles many low-frequency rigs, and the techniques involved in its construction will not be strange to anyone who has built low-frequency gear. A 5763 is used as the crystal oscillator in a popular modification of the Pierce circuit. The plate circuit of the oscillator tunes to harmonics of the crystal frequency, and is capacity-coupled to the grid of another 5763 which serves as frequency multiplier and driver. In both of these stages, sufficient tuning range is provided to eliminate the need for either plug-in coils or bandswitching. The oscillator plate circuit tunes

* Technical Assistant, QST.

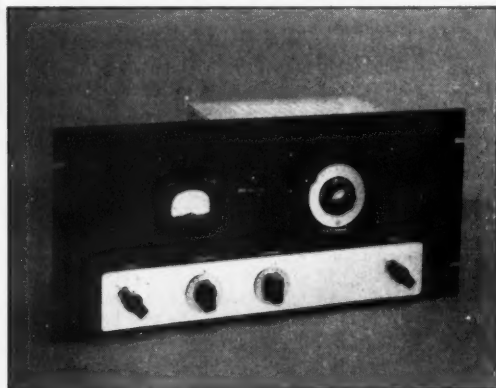
• The 6146, announced earlier this year, fills a real tube need for ham operation in the region above 28 Mc. If you've struggled unsuccessfully to get efficiency in the v.h.f. bands with other tubes, this rig may be the solution to your problems.

from 14 to 30 Mc., permitting the use of 6-, 7-, or 8-Mc. crystals. The multiplier tank circuit covers from 28 to 54 Mc. Thus the stage may be used as a doubler for 10-meter output, or as a tripler for 50-Mc. operation. The tube performs well in either service, and supplies more than enough excitation for the grid of the 6146.

A potentiometer is used to adjust the screen-grid voltage of the driver stage so that close control may be exercised over the grid current flowing in the amplifier. This is of importance in any transmitter where there is apt to be an abundance of grid excitation available, because overdriving results in both excessive screen-grid current and increased harmonic output.

The plate circuit of the amplifier stage employs a novel bandswitching system that minimizes the number of r.f.-carrying circuits that must be switched to change bands. Two separate tank circuits are built around a split-stator condenser. One plate coil is connected across each half of the condenser, and the desired one is selected by a ceramic wafer switch. This system has the advantage that the tank currents do not have to flow through the switch contacts.

Because most operators use separate beam antennas for each v.h.f. band, separate output circuits are used, each designed to couple power into a 52-ohm resistive load through coaxial



Panel view of a 6- and 10-meter bandswitching transmitter. A standard 8 $\frac{3}{4}$ -inch panel is used, with the controls arranged as follows: to the right of the meter, the excitation control, bandswitch, and main tuning condenser; below, with an aluminum escutcheon for "dress," the crystal switch is on the left, followed in the usual order by the oscillator tuning knob, the driver tuning knob, and the meter switch.

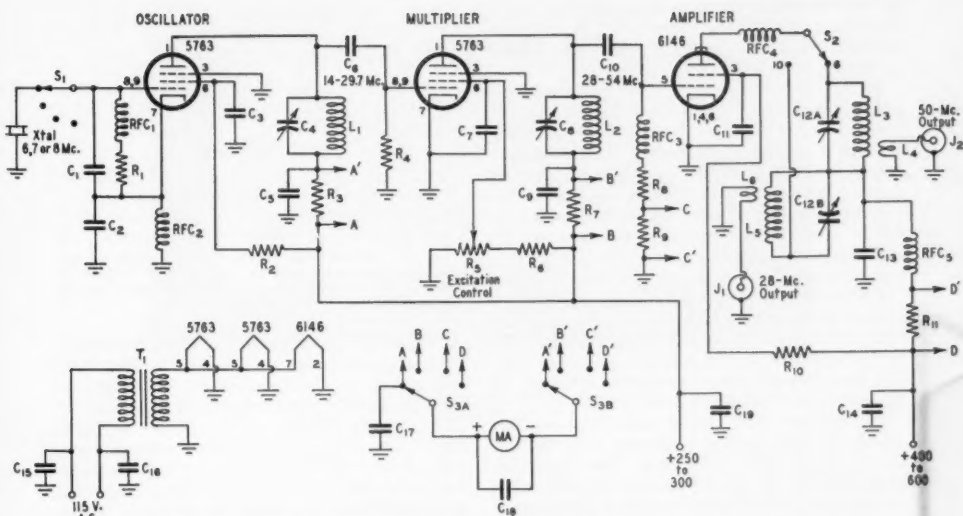


Fig. 1—Schematic diagram of a bandswitching transmitter for the 10- and 6-meter bands.

- C₁—10- μ fd. mica.
 C₂, C₆, C₁₀—100- μ fd. mica.
 C₃, C₅, C₇, C₉, C₁₁, C₁₃, C₁₆, C₁₇, C₁₈, C₁₉—0.001- μ fd. disk ceramic.
 C₄, C₈—100- μ fd. variable (Millen 22100).
 C₁₂—25- μ fd. per-section variable (Millen 23925).
 Two stator plates and three rotor plates are removed to form C_{12A}, while C_{12B} requires no modification.
 C₁₃—0.001 μ fd., 1200 volts working.
 C₁₄—220- μ fd. mica, 1200 volts working.
 R₁—68,000 ohms, $\frac{1}{2}$ watt.
 R₂—22,000 ohms, 1 watt.
 R₃, R₇, R₉, R₁₁—100 ohms, $\frac{1}{2}$ watt.
 R₄, R₅—33,000 ohms, 1 watt.
 R₆, R₁₀—15,000 ohms, 10 watts.
 L₁—10 turns No. 18 wire, $\frac{3}{4}$ -inch diam., $1\frac{1}{4}$ inches long. Approx. 0.57 μ h. (B & W Miniductor No. 3010).
 L₂—3 turns No. 18 wire, $\frac{3}{4}$ -inch diam., $\frac{1}{2}$ inch long. Approx. 0.18 μ h. (B & W Miniductor No. 3010).
 L₃—3 turns No. 18 wire, 1-inch diam., $\frac{3}{4}$ inch long. Approx. 0.21 μ h. (B & W Miniductor No. 3013).

cable. This permits an external low-pass filter to be used when there is danger of TVI.

The amplifier circuit and the driver are enclosed within a shield box to prevent radiation of harmonics from the transmitter itself, and all power leads are filtered¹ to prevent them from acting as antennas for the harmonic energy.

Construction

The transmitter has two major assemblies, as shown in the photographs. The first, a 6 \times 17 \times 3-inch aluminum chassis, contains all parts used in the oscillator and driver stages. The second is a bracket holding the amplifier tube, the bandswitch, and the amplifier tank circuit. This bracket (see Fig. 2) is bolted to the top of the chassis inside the 6 \times 9 \times 5-inch aluminum utility box which serves as a shield enclosure.

¹ Grammer, "By-Passing for Harmonic Reduction," QST, April, 1951.

- L₄—4 turns No. 22 wire, $\frac{3}{4}$ -inch diam., $\frac{3}{8}$ inch long (B & W Miniductor No. 3011).
 L₅—7 $\frac{1}{2}$ turns No. 18 wire, 1-inch diam., 2 inches long. Approx. 0.63 μ h. (B & W Miniductor 3013).
 L₆—7 turns No. 22 wire, $\frac{3}{4}$ -inch diam., $\frac{1}{2}$ inch long (B & W Miniductor No. 3011).
 J₁, J₂—Coaxial output jacks (Cinch-Jones S-101-D).
 MA₁—Plate milliammeter, 0–50 ma. d.c., with shunt to extend range to 0–250 ma. for reading amplifier plate current.
 RFC₁, RFC₃—2.5-mh. r.f. choke (National R-100S).
 RFC₂—2.5-mh. r.f. choke (National R50).
 RFC₄—7 turns No. 20 wire, $\frac{1}{4}$ -inch diam., $\frac{1}{2}$ inch long.
 RFC₅—7 μ h. r.f. choke (Ohmite Z-50).
 S₁—Single-pole 2- to 6-position ceramic wafer switch (Centralab 2501).
 S₂—Single-pole 4-position ceramic transmitting switch made from the following Centralab parts:
 1 Index No. P-171
 1 Switch section Type XX
 S₃—Double-pole 2- to 5-position ceramic wafer switch (Centralab 2505).
 T₁—6.3-volt 3-amp. filament transformer.

The oscillator tube socket is placed in the center of the chassis 4 inches in from the left. The driver tube socket is $1\frac{3}{4}$ inches back from the front edge and $7\frac{3}{4}$ inches from the left. Placement of the tuning condensers for the first two stages is shown in the bottom view, with the oscillator condenser mounted on a small aluminum bracket, with its rotor shaft insulated from ground and brought to the panel through an insulated coupling. The multiplier tuning condenser is mounted right on the front of the chassis. Its rotor shaft passes through a $\frac{3}{4}$ -inch clearance hole in the panel to insulate it from ground. An insulated tuning knob (Millen 10007) with a recessed set screw must be used on this condenser.

Placement of other parts in the first two stages is shown in the photographs, and is not critical except that the coils should be mounted so that they are as far away from the chassis as possible. Coupling condenser C₁₀, which goes from the

plate circuit of the driver to the grid of the amplifier tube, passes through the chassis in a $\frac{1}{2}$ -inch grommet-lined hole visible adjacent to the tuning condenser.

In the bracket assembly which holds the amplifier circuit, the rotor shaft of the tuning condenser must be insulated from ground. It passes through a $\frac{3}{4}$ -inch clearance hole. The rotor connector also passes through a clearance hole to contact one side of plate by-pass condenser, C_{13} , which is bolted flat against the side of the bracket. All r.f. grounds are returned to the same side of this bracket, and are made by connecting the by-pass condensers to the nearest ground point.

Bandswitch S_2 uses one of the new heavy-duty ceramic units, and is made up to fit the requirements of the circuit from standard parts. The switch section is spaced 3 inches behind the detent assembly so that the contacts are close to the rear of the tuning condenser.

The 6-meter tank coil is soldered across the rear of the plate tuning condenser, with the 10-meter coil at right angles to it. The "ground" ends of both coils are soldered to the rear rotor connection on the tuning condenser. The output links are made from smaller diameter B & W Miniductor so that they can be slipped inside the tank coils and moved to the position that affords the desired degree of coupling. Once this has been determined, the link coils are cemented in position. Parasitic suppressing choke RFC_4 is connected between the plate cap of the tube and the rotary arm of S_2 .

Both plate r.f. choke RFC_5 and grid choke RFC_3 are supported on the rear of the bracket by a small insulated tie-point slipped under one of the mounting screws that hold the tuning condenser. The chokes should be separated as much as possible and should be placed at right angles to each other.

Meter switching is incorporated in the design to permit observation of the plate current of each stage and the grid current of the amplifier. We used a 0-50 ma. meter, and wound a shunt to extend its range to 250 ma. for reading plate current in the amplifier stage. The shunt is wound from fine wire around a small resistor, R_{11} , and is mounted on the rear of the meter switch.

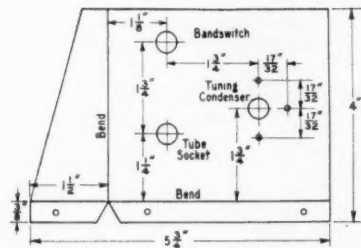


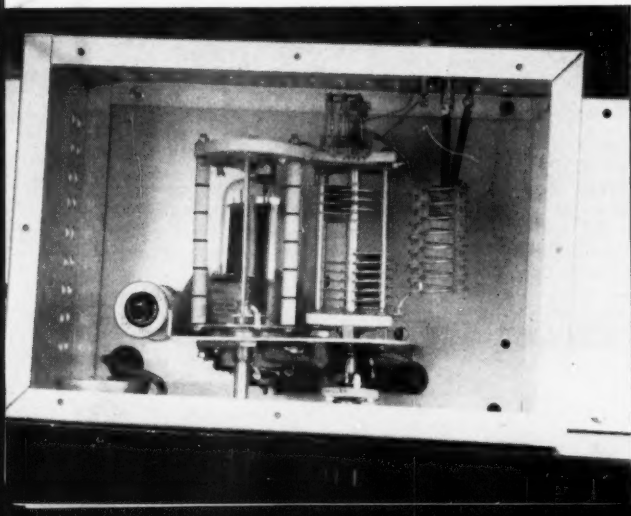
Fig. 2—Dimensions of the bracket used as the foundation for the amplifier circuit. The bracket is bolted to the top of the chassis in the position shown in the photographs.

Shielded wire (Belden 8885) is used for all d.c. leads and the heater wiring, and by-pass condensers C_{14} , C_{15} , C_{16} and C_{19} are placed right at the input terminals as shown in the photograph.¹ The harmonic-filtering condenser for the plate supply lead, C_{14} , must be rated to withstand the applied d.c. voltage and the audio voltage if the transmitter is to be plate-modulated. It is shown mounted between the high-voltage safety terminal and a metal spacer bolted to the chassis.

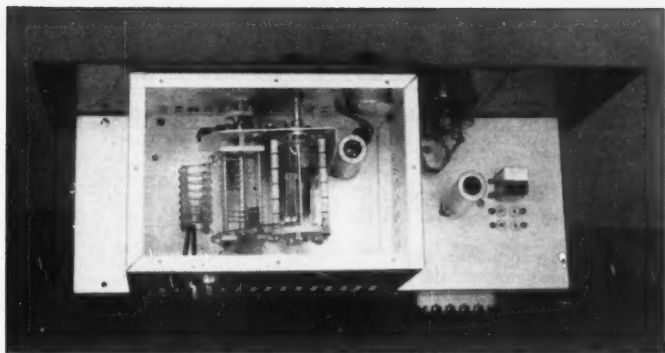
Adjustment and Operation

Adjustment consists merely of making sure that the tuning range of the oscillator and driver coils is sufficient to permit full coverage of the desired bands, and in determining that there is adequate grid current for the final amplifier. With 250 volts applied to the plates of the 5763s, at least 5 ma. grid current should be obtained with the excitation control turned fully clockwise. This is considerably more than is required by the amplifier, which seems to operate best with about 2 ma. current through the 33,000-ohm grid resistor. More current than this merely results in excessive screen current, which not only can reduce output, but may also damage the tube. Plate current in the oscillator stage will run about 20 to 25 ma. with a 250-volt supply, while the driver will take somewhat less, depending, of course, upon the setting of the excitation control.

After checking the low-power stages, plate and screen supply voltages may be applied to the



A close-up view of the interior of the shield box, showing the mounting bracket detailed in Fig. 2, the mounting of the tank coils, and placement of the bandswitch with relation to the amplifier tube. Note that the plate by-pass condenser is mounted on the panel side of the bracket, along with the plate and grid r.f. chokes. In this view, the 6-meter tank coil is at the top of the picture, with the 10-meter coil to the right. The link coils are slipped inside the tank coils and cemented in place after adjustment.



The over-all layout is shown in this top view. The shield box, with numerous $\frac{1}{4}$ -inch holes through the sides (and the top) to provide ventilation, encloses the entire amplifier stage, the excitation control and the driver tube. Coaxial output jacks are mounted on the rear of the box adjacent to the tank coils inside.

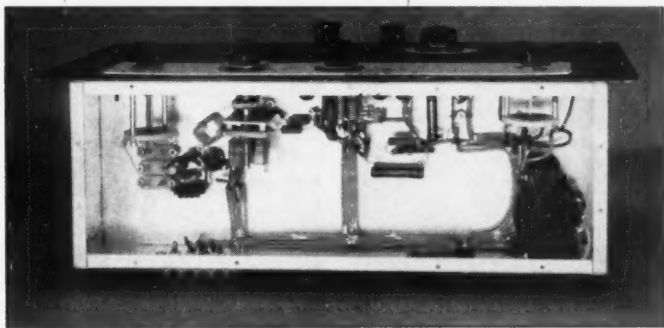
amplifier tube. Off-resonance plate current in the amplifier will probably be well in excess of 175 ma., so caution should be exercised to avoid leaving the plate circuit detuned for more than a few seconds. At resonance, plate current should dip to a very low value, about 10 ma. Again, do not allow this condition to exist for more than a short time, because, like other screen-grid tubes, this one will draw excessive screen current when operated without plate load.

It is suggested that an initial check of the amplifier screen-grid current be made to be sure that it is within the tube ratings. The maximum permissible screen-grid dissipation in plate-modulated 'phone service is two watts. This figure will be exceeded if the amplifier is over-driven, or if it is operated with insufficient plate load. Measure the d.c. screen voltage at the screen end of R_{10} , and compute the screen current by the voltage drop appearing across the resistor. From these data the screen dissipation can be obtained. If grid current is normal, yet the screen dissipation is still too high, increase the plate loading by moving the link winding

inside the plate tank coil, and then check the conditions in the screen-grid circuit again.

In plate-modulated 'phone service the 6146 may be operated at 600 volts and 112.5 ma., or 67.5 watts input. For c.w. or narrow-band f.m., plate voltage may be increased to 750 volts, and plate current to 120 ma., or 90 watts input. These ratings apply to frequencies up to 60 Mc. In regions where TVI is a possibility, a low-pass filter should be connected between the output terminal and the antenna coupler, and the bottom of the chassis should be closed with a tight-fitting aluminum plate. If a filter is to be used for 6-meter operation, be sure that its cut-off frequency is higher than the operating frequency!

If you desire to use a balanced output line instead of the coaxial arrangement shown, 300-ohm Twin-Lead may be used, with ceramic crystal sockets replacing the coaxial output jacks. When working into the higher-impedance line, the size of output coils L_4 and L_5 can be a turn or so smaller than those specified in the parts list, which are designed for optimum transfer of power into 52-ohm loads.



The below-decks wiring makes extensive use of shielded cable to reduce the possibility of TVI, and is uncluttered because parts are not crowded for space inside the $6 \times 17 \times 3$ -inch chassis. In this view, the oscillator circuits are at the left, the driver stage in the center, and the meter switch and heater transformer at the right. By-pass condensers filtering all power leads are visible adjacent to the power terminals.



How's DX?



CONDUCTED BY ROD NEWKIRK,* W9BRD/1

How:

The 'phone division of the 18th Annual ARRL DX Competition is now over the dam but the c.w. session is upon us.

Rugged individualists who manage to get full time in using both mediums should perhaps receive some kind of award of their own, win or lose. Or, even more appropriate, how about a toast dedicated to some really rugged station installations? (Jeeves suggests slugs of coffee spiked with benzedrine.)

Anyway, it's not over yet. Take inventory of your remaining 866 spares, grab your keys, and dig in!

What:

Roses are red and violets are blue;
Twenty is punko but that's nothing new.

— Anon.

But let's not be bitter. VE3CCK isn't. AG2AG (14,008), EA9AD (086), EK1AR (027), CR5AD (074), FF8s AF (040), AG (082), AJ (098), OQ5VN (020), PZ1WK (179) on 'phone raised with c.w., I1NU/Trieste (060), VK9s GW (096), KK (100), VQs 2GW (035), JG (105), 4AO (050), 4HJP (046), ZS3s E (047), Q (030), CT3AA (045) and 9S4AD (070) kept Ron happy. "Things have been pretty dull with most consistent signals coming from Japan, etc., in the early evening around 6 p.m. EST," says W8UPN. Newt scored with KR6HO (070), JAs 7SS (088), 8AB (058), OX3EL (063), VU2NB (110), ZE4JC (063), VQ1RF, SP3AF (020) and KT1LM (073). VP8AD (003), Y03RD (090), 4X4DE (070) and an FF8 furnished c.w. practice for XE1AC. FL8BC (076) got away. W2GHH took time off from 80 to grab HR1KS, VS6AE (089), SP3PF, VP3VN (081) and TF3SG (077). DLALQ notes LZ1KAB on the low edge regularly with a T6 chirpy note. The guy sticks to Curtain-country QSOs, though. W3MFW is getting his share: FQ8AE (030), KR6FK (060), VQ5CW (1030) and some FF8s. Russ still pursues KB6AQ (060), ST1GC (030), ZD4BH (090) and one ZA1A (050). AP4A (030-035), HZ1AR and XZ2EM put good signals into Elizabethtown each week end. For one of his first DX QSOs W8HEV (ex-WN8HEV) picked a dilly. One ZD7AR (026) was raised. "After 32 years in this racket, I worked three new ones in a week," writes W2GVZ. Those included EA0AB and VK9XK. "It's cheaper to move to WI1 than pay rent," reads a cutting remark from W9NN. (We should ground his feeders for that one, Jeeves.) Bob needs QSLs from ZM6AK, VQ2GW, HH3L, HR1AT and FG7XA to clinch his DXCC. W5ASG thinks the TT0KAA he heard was a W2. Bill added VK1BS (051), MP4BBD (084) on almost daily around 8:30 a.m. EST, OY3IGO (032-035 drift) EA0s AB (115) and AD. He also hears people calling an AC4YN whose reappearance would seem quite unlikely. CR6AO, VQ1RF, W13BZL, ZD6DU, VP2MD in the Leewards, FD8AB, VP8AP and some VK9s fell victim to W8SYC. Clint's latest QSLs: VK9NR, CP5EK, ZD6JL, MP4KAE, FQ8s AC, AG and HC. He wonders where his VR5PL, VP5BH, UP2KBC, AC4RF, ZP8BL and ZP6AB pasteboards are. W4KE's bookkeeping and QSLing for the Sweepstakes held his DX down to VQ4RF, ZE4JC and CR5AD: W2ABM adds ZS2MI, SP9KKA, ZC3AX (028), PILLS (037), KR6AF (080) and FD8AB. W4EV reached 140 with some help from VQ4FCA (062).

*New Mailing Address: Effective immediately, please mail all reports of DX activity to DX Editor Newkirk at ARRL Headquarters, 38 La Salle Rd., West Hartford 7, Conn.

FQ8AK (090), IS1FIC (070), OQ5PE (020), GC2FZC (040), SV9WY (100), HZ1HZ (055), CT2BO (040), EA6AM (065), FKSSAA (030), ZD2JAB (048), ZE2JN (025) and 9S4AX (014). On Ben's stalk list are AP2N (050), KM6AX (070), MC1WN (065), VK1BS (065), ET3R (080), GD3GBM (035), ZD6 1SD (085), 7AB (085), 8CR?? (085), ZS9N (040), VU2s AC (040), JG (045), VS6CG (070) and FB8BB (035). From the Northern California DX Club's DXer we lift UH8KAA (097), ZB2L (031), MP4KAE (042), VP8AI (048), VQ4KIF (020), ZD1AJ (009) and FF8AF (037). SW4AF (070) in the Yemen, VQ8CB (110), FN8AD (103), FL8AE (030), MI3AB (020), LZ1RF (050), YI3ECU (118), ZA1AB (020), ST2GL (025), ZD4BH (025), ZD2FFB (030), VP5BF on T. & C. (080) and HZ1AR (075) show up in the Southern California DX Club DX Bulletin. The West Gulf Division DX Club DX Bulletin fills us in on (mornings) F9JW/FC (077), F9QV/FC (093), F9JD/FC (060 18), FR7ZA (022), FG8AB (010), FQ8s AB (085), AC (155), FK8AE (042), GD3s KKG (028), FBS (090), GBG (065), GC3s EML (090), HFE (050), KM6AW/KS6 (050), T1CW (050), IS1CNQ (060), AP2K, 4UA (319) in Pakistan, 4UAJ (108) of Kashmir, HB1HY (023), LZ1RS (070), VK1WO (051), VS6BJ (010), VS7s GV (040), NG (040), RA (068), VP1AA (100), VP2KM (065) in the Leewards, VP3FD (049), VQ3s JTW (047), RJG (029), SP6XA (100), JY1AY, MD5JS (036), MD2DW/MD5 (065), MC1SD (060), ZK1BC (025), ZB1AJX (052), ZC4s KN (015), XP (087), ZD6s JL (034), HN (056), RD, ZS7s C (037), D (050) and ZS8MK; (evenings) FY7YK (027), FM7WF (023), FM8FP (016), FBSAB (020), KX6ZA (065), KH6QY/KC6 (100), LB6XD (020), VP8s AS (038), AT (001), AU (071), ZS3E (061), ZD6 1SD (101), 1SS (072), ZDCP (021), T1JAC (047), XZ2FK (020) and HZ1AA (017). Moral seems to be: Get Up Early!

Twenty 'phone is still worth a shout or two. W2APU understands ZS2MI to be on regularly Monday through Saturday (14,180-350). Best way not to work ZS2MI is to climb on his frequency. Charles adds VK1NL (145) of Heard Isle, CR4AC (140), CS3AC (350) and HE0LA (170). MI3ZZ (362), MP4KAF (362), HZ1TA (350), FB8BB (314), CR6CB (137), VQs 2DT (163), 4ERR (167) and YU1AG (150) answered XE1AC. DLALQ rounded up GD3UB, V87FG, SU1AS, MP4s KAC (290), KAW, VQ8CB (310), TA3AA, LJ2B, EA6AR,



YI3BZR, SV6 WP, WR, TF5TP and VK1AWL.
At W3MFW we find MD2JB (330), CN8FI (389), TDRK
of Guatemala (170) and VP2JE in the Windwards (185)
of A3 activity ascertained by W5KUC's DX Bulletin
devotees: CRs 6AL (340), 6AV (360), 6BC (200), 7AH
(340), 7BP (330), 7CD (307), 7SF (120), ZPs 3NB (296),
7AW (300), 9CM (370), ZD4AX (115), PZ1WK (390),
ZS3s Q, Z (315), ELs 5A (331), 9A (345), VQs 2DT (384),
2GW (305), JCP (375), 4AA (320), 4AX (145), 4VL (320),
5AU (156), 8AL (136), HH3DL (155), H8WF (190),
HC8GI (190), HZ1AB (336), MF2AA (310), MD2AM
(395), MT2KH (330), MP4s KAD (153), KAP (364), EA8s
AP (380), AX (180), IT1BXX (345), VPs 2LE of the Wind-
wards (290), 2AF in the Leewards (180), 8AP (105), VK1s
BS (135-175), 1SW (158), ZCs 3AF (080), 6JM (317),
ZK2AA (167), FB8BB (314), FK8AA (118), FQ8AI (320),
GD2s FRV (147), RF (367), VR2CG (351), VU2s BH (140),
CN (302), CQ (276), RS (130), RD (165), KR6HF (175),
YN4CB (180), MI3s BH (205), DW (183), LK (081), LV
(077), NJ (189), ZX (188), OQ5BG (158), OX3MW (355),
4X4s AF (327), AS (380), DR (175), RE (368) and ZE1JX
(333).

Violets are blue and roses are red;

Forty will open when we've gone to bed.

— *Jecees.*

We can do without any more of that. W2WWP wasn't caught napping, anyway: ZK1AZ (7028), SP5AF (011), VKs 0RU (030), 9XK (028) and KH6QY/KC6 (020) W3DLI and VE3CCK caught TA2EFA (073). The latter helped VE3CCK to a WAC in two hours, 17 minutes. W9NTQ clipped YU1ANO (012) and W2QHH raised YV5AL (038). W2EEY ran into VP9AAA/AM operating from a plane over Bermuda; W8YGR adds VP5BH (005) of the Caymans. KM6AX (040), YU3FMC (015), FA8DA (005) and VQ4HJP (021) QSLs are awaited by WHUZ. W3JAK mentions TFs 3NA, 5SV and OH3NY while W4QCW has VP2OI (000) and KZ5FJ 'way up on 7285 kc. Thirty watts at W8EXZ knocks off Oceania and Europe conveniently as well as TI2PZ (007) and KS4AQ (019). Jim is curious about one XB8R (024). W9ESQ found KH6AD/KW6 and is thinking of hoisting a vertical. SWL Eric Trebilcock, Victoria, Australia, tells W1AW (Chas) of hearing the long-path sigs of W1s AW ALA OMI, W2s GFG GUM WZ, W3MCA and W4VE during last year's 88. Nice DX.

Eighty has its ups and downs as usual; you have to be lucky enough to be in on the ups. Novice WN4UGD already has ten countries on the band. FA8BG, KV4AA and HPIAW swelled the total. W2QHH specifies ON4AO (3502), PA0XYZ (22), CT2BO (49) and KG4AD (02-05). Howy needs just about ten more countries for 100 on eighty. VP8AP in South Orkneys (13) has been working Europeans. W4BRB slipped the following info to W1RWS: VS7NG (10) has been worked by PYs 2AJ, 7WS and G5DO. VS7NG has heard W4BRB; Ws 2QHH, 6ZAT and 8BKP have heard VS7NG. A VS7/W two-way is imminent. W4BRB raised VQ4CM and OY2Z (06), while VE1JD scored on FF8GP (12) and OX3EL (20). New 80-meter stuff rumored active: VK9KK, VR2CG and ZK1AX (07). W6ZOL made the grade with Gs 2PL (28), SVB (05), FA8BG, ZL4JJ (03) and CO2FN (15). W2WWP has FA8RJ (06) and we hear that VQ4CM worked South America for his 3.5-Mc. WAC. Fourteen watts got KG4AD for W9OES who says he also heard ZK1AC (06) working a W7.

On seventy-five 'phone, the West Gulf gang and W5KUC' hear of TG9AD (3802), YN4CB, KZ5PC, XE2W, VP7NW (3802), HR1BG (3830), ZS6DW (3920), ZL3s FM (3802) and PS (3802). W4QCW says VP5FR (3795) and HH2X (3799) are handy.

We'll have to quit deriding *ten* so much. This band is picking up. W2AEB and W2ZVS are at it again. The former captured TA2EFA, VQs 2NS, 3PHD, ZS3s G, M, ZDs 1SW, 4BF, ZEs 2JZ, 3JT and 4JJ. W2ZVS managed OQ5s BW, GA, CRs 4AE, 7AD, TG9IU, HH1OH, ZP4BB, MD2AM, PZ1D and HC8GI. YL W4TAV was in on some European openings which aren't to be sneezed at these lean days; also OQ5s CC, CJ, an MD2 and a ZE3. The foregoing was all 'phone. On c.w., W2QHH hit FF8AG (28,080), W4TAV nailed FF8AC and W4KE worked KW6AR. W9JTN works Europeans now and then on the low edge. More 'phones from W5KUC & Co.: HH2W (310), H16EC (312), KR6GV (492), GC2RS, CR6AT (320), VP2GX (250) of the Windwards, ZK2AA

(300), ZD4BF (325), ZE1JE (110), PZ1RM, OQ5BQ (110) and 3V8AX (200).

One-sixty deserves a poetic eulogy of some kind but it can very well speak for itself. The "pond" has been crossed quite regularly during the DX Tests on this band. W1BB worked Gs 2AJ, 2PL, 5JU and 6GM plus GW3ZV and KV4AA during the wee hours of January 20th. W1LYV raised Gs 2PL, 3DIY, 6BQ and GW3ZV on this date. Larry also swapped reports with an EK1 whose call he's not positive of. Other Europeans worked earlier at W1LYV were GW3FSP, G3s COJ, ERN and PU. Some of the participants on our side were W1s BB EFC EFN LYV SS, W2s BFA TRK, W3OKU, W9s CVQ NH and W9NWX (ex-W4NNN). ZL1AH is still on 160 after 7:45 a.m. EST using 1900.5 kc.

Where:

The "preliminary" QSL bureaus set up by the PJ gang: Curacao — F. Dunneber, Sulfiant T-24-1, Curacao, N.W.I.; Aruba — S. J. Heerings, Post Box 80, San Nicolas, Aruba, N.W.I. The W ban for PJ QSOs is still on at this writing but you can file this info for the future. The corrected bureau address for Sweden is: S8A, Stockholm 4, Sweden.

AG2AE	Amateur Station Custodian, 2nd Bn. 351st Inf. Regt., APO 209, % Postmaster, New York, N. Y.
AG2AF	E. R. Horwinski, DAC, Hq., TRUST TI&E Section, APO 209, % Postmaster, New York, N. Y.
CR6AO	Jorge Barbosa, Box 1227, Luanda, Angola
CR9AF	José Pires Antas, Oficinas Navais, Macao, Asia
DL4LQ	PEC A. Rugel, US55147901, 75th Sig. AGC Co., APO 46, % Postmaster, New York, N. Y.
EL9A	A. H. Le Monze, PAA, Roberts Field, Liberia
F7AU	Maj. Fred Powell, 0-1643977, SHAPE (ALFCE) APO 11, % Postmaster, New York, N. Y.
FF8AJ	Box 230, Bamako, F. W. A.
FL8BC	G. Besset, Box 335, Djibouti, French Somaliland
ex-FQ8AC	Jean Moyon, 71 rue H. Barbusse, Nanterre, Seine, France
ex-HR1PA	QSL to (W3SZF)



Even using the term loosely, the radio den at SM5ZK can hardly be called a "shack." Outside and not shown, a 10-over-20 rotary beam graces the top of a live pruned fir tree. (Photo courtesy W6CIS)

JA7AR APO 917, % Postmaster, San Francisco, Calif.
 JY1AY % RAF Station, Amman, Jordan
 ex-KH6AFV K. Kawamura, W9CFY, Pioneer Hall, U. of Minn., Minneapolis 14, Minn.
 KZ5PM Curundu, Canal Zone
 MD1VK E. Angell, Nr. 5 Force Broadcasting Svc., Benghazi, Cyrenaica
 MI3LK Box 274, Asmara, Eritrea
 MP4BBD (QSL via RSGB)
 MP4BBP Box 631, Awali, Bahrain, Persian Gulf
 MP4KAD (QSL via RSGB)
 ON3BI (Ex-OX3GG) Frank Biloon, NBS Ionosphere Stn., Hq. & Hq. Sqdn., APO 858, % Postmaster, New York, N. Y.
 PX1AA Sgt. John N. Ackley, 12 Merton St., Newton, Mass.
 TA2EFA Lt. Cdr. C. M. Sturkey, USN, TUSNG JAMMAT, APO 206A, % Postmaster, New York, N. Y.
 VP2LE Martin Elwin, Box 170, Castries, St. Lucia
 B. W. I.
 VQ1RF (QSL via VQ4RF)
 VQ2DT Dave R. Taylor, % Post Office, Kitwe, Northern Rhodesia
 VQ5CW Box 89, Jinja, Uganda
 ex-VR1G Wm. E. Winters, 461 Oakley St., Salt Lake City, Utah
 VU5AB (QSL via RSGB)
 YU3FLL C. Zeljko, Kerasnikova 7, Ljubljana, Yugoslavia
 ZB2A (QSL via RSGB)
 ZD4BF P. O. Box 7, Takoradi, Gold Coast
 ZD4BH (QSL via RSGB)
 ZD6DU (QSL via RSGB or to G2HIDU)
 ZP3NB Ian Williams, Casa Sapuceay, Paraguay
 ZS2MI (QSL via ZS6BW)
 3V8AX P. O. Box 837, Tunis, Tunisia

Lots of help this time: W1s AW (Chas), ODW, W2s ABM APU KZE ZVS, W3MFW, W4CYY, W5ASG, W8s SYC UPN YGR, W9s CFT TRD, W9FID, XE1AC, So. Calif. DX Club Bulletin, Virginia Section Bulletin, West Gulf Division DX Bulletin and OVS's OEM. We can always use more.

Tidbits:

PJ5FN tells us by way of letters to W5FNA, W6BIL and W1KE that the complete officially-recognized status of amateur radio in the Netherlands Antilles is but a step away. This should be instrumental in removing the FCC ban on the working of PJs now in effect. Included among the tentative regulations for PJ amateurs: bands from 3.5 to 10,500 Mc.; powers of 150 watts input below 50 Mc. and 50 watts above; bandwidths of 10 kc. for a.m. and 30 kc. for f.m. DL4IA is heading back home to Massachusetts. John has collected ex-calls PX1AA, PX1AB, D4A1A and J2USA during his travels. A line from W2MQH: "During my visit to Germany last September I met several [DL] hams and enjoyed many happy hours with them. also had quite some help from them during my travels there." Illness in his family, rebuilding and work around the house curtailed W2HAZ's DXing. What a time to remain stuck at 99 confirmations! We hear from Lt. Cdr. Sturkey in Turkey where he has TA2EFA on the air. He has held U.S. calls W1QZZ, W2EFA, W3EFA, W4CWD and W8TNA. TA2EFA has been hitting 10 'phone and 40 c.w. He has difficulty working into W6 and W7 on ten with his 250-watt n.b.f.m. rig and 3-element rotary. Jean and Jack of FQ8AC are now spending a six-month holiday in Paris. [I'll settle for six hours, Boss. — Jeeves.] (Bah. The only French you know, Jeeves, is



Tel-Aviv's 4X4AG is consistently worked on 14-Mc. 'phone and c.w. A pair of 807s modulate 807s at 120 watts. Dipole antennas are used. Operator A. Kachioff (shown) now studies at the University of Miami but 4X4AG is kept active by his brother, also an amateur.

par avion.) The boys send their best wishes to the W/VE gang and state they'll duplicate lost QSLs if contacted at the address listed in "Where". Watch for them bearing a jointly-held F call. Old OX3GG is now OX3BI and is still having little luck in obtaining printed QSL stock. Frank is anxious to clean up the backlog and will do so as quickly as possible. VQ4ERR bumped into a Mr. Hawkins who, it turned out, was one of the members of the Pang Jin party of the ill-fated globe-trotting Chinese junk (Oct., 1939, QST). Small world. Could we persuade FFSAC to try a little Field Day work? He tells W6AM he is but three miles from Rio de Oro. GM3CSM would like it publicized that he is not the Ian Hamilton involved in the "Stone of Destiny" episode of last year. He's been getting much mail from folks under the wrong impression. Notes from the 'phone archives of W2APU: The previous operator of ZS2MI didn't bother to keep a log; hence, no QSLs. The present operator, aided and encouraged by W9RBI, W1NWO, W2APU, ZS6BW, ZS6KD and others, will see that things are done properly this time. He will transmit his log by radio to ZS6BW who has tackled the lion's share of the work. Only contacts made since November 18, 1951, can be verified as no log exists for previous ZS2MI QSOs. Strangely enough, ZS2MI seems to prefer operation within the confines of the U. S. 'phone band. F7AT, of 3A2AG and PX1AR, has returned to the States (California) for reassignment. EA8AW (ex-EA8CO) had reportedly been given the call EA9DC for contemplated operation in Ifni and Rio de Oro. TI2s RC and RU with other associates intend a trip to Cocos Isle (TI9) sometime in March. CN8CS (ex-FQ88N) may find himself an FY7 before long. He prefers 'phone and he does QSL. His call may be FY7SN. Could there be some ethical way to increase VQ8AL's interest in working W 'phones? W2APU could use tracing data on ex-MP4BAB. Any help?

XE1AC paid West Hartford a visit and has Jeeves all het up about the \$80,000,000 pirate treasure known to be buried somewhere on TI9. He's now cooking up a mine detector with a 304TL final.

These Victorian hams you very well may have worked are VK3s KE, FO, ED, and DY. VK3DY is secretary of the Victoria division of the Wireless Institute of Australia. (Photo courtesy W5AGB)



QST for



The World Above 50 Mc.



CONDUCTED BY E. P. TILTON,* W1HDQ

JUDGING by reports from the v.h.f. activity centers, the 5th Annual V.H.F. Sweepstakes was the best on record, yet there were considerable areas from which no sign of activity was reported. Apparently the result of the combined impetus of scores of WNs and the organization for civil defense communication, the number of 2-meter calls was swelled in many urban localities, and at least one 144-Mc. operator rolled up over 200 different stations worked.

Use of 50 Mc. was down in comparison to the summer parties, probably because no DX breaks came along to make that band pay off the way it does when openings swell the totals. Reports of propagation conditions vary widely. From the West Coast comes the comment that it was the "best contest yet, but under the worst conditions!" The Middle West got no great help from the weatherman, but east of the Great Lakes a fairly good inversion developed Sunday afternoon and got better as time went on. In the last hours of the party the W1s, 2s and 3s were adding new contacts and section multipliers right up to the closing gun.

Tabulation of the final results takes a bit of time in a contest of this magnitude, particularly where club scores are involved, so no final picture can be given at this time. Some highlights are visible, however, from a quick look at the nearly 300 reports already on file. W2NLY's 211 contacts in 9 sections for a score of 3780 points looks like a good candidate for top honors, though we know that Jim was getting plenty of competition that may show up when all the club reports are in. There was a hot time in Western New York and Ontario, as evidenced by 91 contacts by W2OWQ, Niagara Falls, and the same number for VE3AIB, Toronto. Both had 4 sections, for identical scores.

There was a surprising turnout on 144 Mc. in Ohio, Indiana and Illinois. W8LPD had 66 contacts in 5 sections for 660 points, and W9PK 53 in 5 for 530. Particularly around Dayton, Ohio, where scores of 2-meter rigs have been built for c.d. work, was the activity many times that of previous contests.

Out on the West Coast, W6MHF has the high in the San Francisco section so far, with 63 contacts in 4 sections. W6LOZ/6 caught 106 in 5 sections, for the best Santa Clara Valley entry received to date. There were all too few entries from W4, W7 and W0, however; these being areas that depend largely on DX breaks for v.h.f. interest.

* V.H.F. Editor, QST.

2-Meter Standings

Call			Call				
States Areas Miles			States Areas Miles				
W1HDQ	16	6	650	W5FBT	6	2	500
W1IZY	15	6	750	W5FEK	6	2	500
W1MNF	14	5	600	W5IRP	6	2	410
W1BCN	14	5	580	W5ONS	5	2	950
W1DJK	13	5	520	W5FSC	5	2	500
W1CTW	12	4	500	W5JLY	4	2	650
W1KLC	12	4	500				
				W6ZL	2	2	1400
W2BAV	21	7	1175	W6WSQ	2	2	1390
W2NLY	18	6	750	W6PIA	2	2	1390
W2PAU	16	6	740	W6EXH	2	2	193
W2AZL	16	6	—	W6ZEM	6	1	415
W2DFY	13	5	350	W6GGM	1	1	300
W2CET	12	5	405	W6YYG	1	1	300
W2DPB	12	5	500				
W2QED	12	5	365	W8WJC	21	7	775
W2FIJ	12	5	—	W8BFQ	21	7	775
W2QNZ	12	5	—	W8WRN	19	7	670
W2BVU	12	4	260	W8WVX	18	8	1200
W2ORI	9	6	570	W8UKS	18	7	720
				W8EP	17	7	—
W3NKM	19	7	660	W8WSE	16	7	830
W3RUE	18	7	760	W8RWV	16	7	500
W3QKI	17	7	820	W8BAX	15	6	655
W3KWL	15	7	560	W8PQK	13	7	—
W3LNA	14	7	720	W8CYE	12	6	—
W3GKP	14	6	650	W8CPA	12	—	650
W3OWW	13	6	900				
W3KUX	12	5	575	W9FVJ	20	7	790
W3PGV	12	5	—	W9UCH	20	7	750
W3LMC	11	4	400	W9SUV	19	7	—
				W9EQC	18	7	820
W4MKJ	16	7	665	W9BOV	15	6	—
W4HHK	15	6	690	W9WOK	15	5	690
W4JDN	13	6	—	W9AFT	14	—	—
W4JFV	13	5	830	W9NFK	12	7	690
W4IKZ	13	5	650	W9LIA	12	7	540
W4JFU	13	5	720	W9GTA	11	5	540
W4OXC	13	7	500				
W4CLY	12	5	720	W0LHD	15	6	725
W4JHC	12	5	720	W0NFM	14	7	660
W4OLK	12	5	720	W0EMS	13	5	1090
W4FJ	12	5	700	W0ZJB	12	7	1097
W4LRR	5	2	900	W0WGX	11	5	760
				W0HXY	8	3	—
				W0JHS	7	3	—
W5JTI	14	5	670				
W5QNL	10	5	1400				
W5CVW	10	2	1180	VE3AIB	12	6	600
W5MWW	9	4	570	VE1QY	11	4	900
W5AJG	9	3	1260	VE2BOW	8	5	520
W5ML	9	3	760	VE2BQN	7	4	540
W5ERD	8	3	570	VE2TN	7	4	480
W5VX	7	4	—	VE2BPB	6	4	525
W5VY	7	3	1200	VE3AQG	6	4	520
W5ABN	7	2	450	VE3DER	6	4	450
W5SWV	7	2	—	VE3EAH	5	4	380

Proof that the Novice Class license is becoming a major activity-building factor in 2-meter work in the more populous areas is obvious when we examine the contest reports for WN calls. An incomplete tabulation of the first 150 reports

50 WAS Mc.

W0ZJB.....48	W4IUJ.....38	W8BFQ.....39
W0BJV.....48	W4BEN.....35	W8LPD.....37
W0CJS.....48		
W5AJG.....48	W5VY.....47	W9ZHB.....48
W9ZHL.....48	W5GNQ.....46	W9QUV.....48
W9OCA.....48	W5JTI.....44	W9HGE.....47
W6OB.....48	W5ONS.....44	W9PK.....47
W0INI.....48	W5ML.....44	W9VZP.....47
	W5JLY.....43	W9RQM.....47
WIHDQ.....47	W5JME.....43	W9ALU.....47
W1CLS.....46	W5VV.....42	W9QKM.....46
W1CGY.....46	W5FAL.....41	W9UTA.....45
W1LL.....44	W5NHD.....41	W9UNS.....45
W1KHL.....44	W5FSC.....41	
W1HMS.....42	W5HLD.....40	W0QIN.....47
W1LSN.....42	W5HEZ.....38	W0DZM.....47
W1EIO.....41		W0NFM.....47
	W6WNN.....48	W0TKX.....47
W2RLV.....45	W6UXN.....47	W0KYF.....47
W2BYM.....44	W6TMI.....45	W0JOL.....44
W2IDZ.....43	W6WIS.....41	W0JHS.....43
W2AMJ.....42	W6OVK.....40	W0PKD.....43
W2MEU.....42		W0HVW.....42
W2FHI.....41	W7HEA.....47	W0MVG.....41
W2GYV.....40	W7ERA.....47	W0PLI.....41
W2QYH.....38	W7BQX.....45	
	W7DYD.....45	VE3ANY.....42
W30JU.....45	W7JRG.....44	VE3AET.....35
W3NKM.....41	W7BOC.....42	VE1QZ.....32
W3MQU.....39	W7JPA.....42	VE1QY.....31
W3JVI.....38	W7FIV.....41	XEIGE.....19
W3RUE.....37	W7CAM.....40	
	W7ACD.....40	
W4FBH.....46		
W4EQM.....44	W8NSS.....46	
W4QN.....44	W8NQD.....45	
W4FWH.....42	W8UZ.....43	
W4CPZ.....42	W8YLS.....41	
W4FLW.....42	W8CMS.....41	
W4MS.....40	W8RFW.....41	
W4OXC.....40	W8LBH.....39	
W4FNR.....39		

Calls in bold-face are holders of special 50-Mc. WAS certificates listed in order of award numbers. Others are based on unverified reports.

received shows 14 WN1, 55 WN2, 12 WN3, 3 WN5, 11 WN6, 1 WN7, 12 WN8 and 7 WN9 calls listed as worked. A rough guess puts this at something like 10 per cent of the stations active, with the figure running well above that in parts of New York and New Jersey. By now, we should be well over that habit of not tuning above 145 Mc.!

DX Down Under

The peak of the sporadic-E season for our friends in Australia, New Zealand and other South Pacific Islands turned up some surprising DX on both 6 and 2. Last month we reported the near-record first 2-meter work between ZL and VK, and now we hear of more 144-Mc. DX, this time between VK5GL and VK6BO, about 1150 miles. This happened on Dec. 30th, in the midst of several days of almost continuous DX that swelled the scores being recorded in the Ross Hull Memorial V.H.F. Contest. With 50 Mc. wide open, VK5GL made simultaneous tests on both

50 and 144, and was heard immediately by VK6BO. Crossband contacts were made both ways, as well as a two-way exchange on 144 Mc.

Widespread 50-Mc. DX has brought in some "rare" ones on 6, too. At least they would be rare to Ws! VK9XK, Samauri, New Guinea, has worked ZL, and all Australian states except West Australia. Up in the Fiji Islands, VR2CG (ex-ZL3LR) had worked about a dozen ZLs crossband to 10 and 20, with his transmitter on 51.15 Mc. He has a converter going by now, and will be looking for chances to check with any interested parties. Our thanks to VK5JD and VR2CG for passing along these items.

Here and There on the V.H.F. Bands

In order to further their aurora studies at Cornell University, W2ZGP and W2TTU have arranged for the use of a 1600-foot elevation near Cortland, N. Y., as a transmitting site. The rigs (eventually to be high-powered jobs on about 50.6 and 146 Mc.) are keyed by remote control from the Ithaca receiving location on 430 Mc. Large screen-reflector arrays have been erected at the remote site, and preliminary tests have been run on the control system, using 322s on 6 and 2.

An encouraging response has been received to ARRL's requests (through bulletins and QST) for v.h.f. aurora observations. In case you've missed other announcements, reporting forms are now available for recording aurora effects observed on the v.h.f. bands. If you have not already received yours and would like to take part in this program, drop us a card and a supply of the forms will be sent at once. Observations should be sent to ARRL; we in turn forward them to Cornell University for use by W2ZGP and W2TTU.

The winter sporadic-E season was unusually productive for VE5NC, Boharm, Sask. Basil heard radioteletype signals, believed to be of Alaskan origin, close to 50 Mc. several evenings in late December. VE7AFL and W7FIV were heard on the 23rd between 10:30 and 11:30 p.m., and the f.s.k. signals erratically after midnight. There was visible aurora on the 27th, and a good opening to VE7 between 10:15 and 11 p.m., with signals clear and steady from VETs AAH, DU and NM and somewhat erratic f.s.k. reception until after 1 a.m. F.s.k. was audible again at 7:55 p.m. on the 28th, and VE3AET and W8CMS began coming through at 9:05. W0QIN and W0UCE came in at 9:55 and VE7AAH and VETBG soon after. The band was open in both directions, and the f.s.k. signal remained in until about 11 p.m. Contacts were made with W9OCA and VE3AET.

Need North Carolina on 144 Mc.? W4CVQ (ARRL Roanoke Division director) is doing his best to provide it. Jake is on nightly with close to 1-kw. input, and a 12-element horizontal array 110 feet above ground. Each evening he makes test transmissions between 9 and 9:05, swinging his beam between northeast and northwest. So far he has heard only ten stations since he moved to Raleigh last October. There should be better days coming!

Another nightly sked, this one between W8BFQ, Everett, Ohio, and W4JDN, Erlanger, Ky., at 8:30 p.m., has served as an official band-opening time for 2-meter operators over a wide area, according to W8PTF, Dayton. He says the Dayton spark plug is WNSHOH, who though only recently licensed has been an ardent v.h.f. listener for years. He has built or helped to build lots of equipment throughout the area, and has monitored the 2-meter band endlessly, often calling other 2-meter operators by telephone to get them on the air when good conditions start to break. The much-improved scores of many Ohio stations in the V.H.F. SS demonstrate what this kind of enthusiasm can do for v.h.f. activity.

Still another sked, a 300-mile tough one between W3QKI, Erie, Pa., and W2NLY, Oak Tree, N. J., has not been working this winter, and both parties wonder whether this is because of a simultaneous change in antennas, or the hazards of winter. W2NLY changed from 30 to 48 elements, and increased height, and W3QKI went from an 8-element Yagi at 90 feet to a TV-style double V at 110 feet. Both seem to have improved local coverage, but they have not

worked each other since the new arrays went up.

When he was on 144 Mc. in Germany, DL4XS knew what it meant to work for his contacts. For a long time he traveled 36 miles each way to get on the air from a choice location near Wiesbaden, maintained jointly with DL3KE. Between the two of them, they worked plenty of choice 2-meter DX. Now DL4XS is settled in Midwest City, Okla., and is looking forward to working some good stuff from home, for a change. As soon as his W5 call comes through, he'll be in there pitching. Remembering all the weak-signal work being done with low power in Europe, mainly because the gang over there use c.w. effectively, Jo hopes to get more of the 144-Mc. Ws to do the same. He used to maintain consistent contact with PA and ON stations, the closest of which was 212 miles away, and often was able to work G3DIV/a, 365 miles, under seemingly normal conditions. With the higher power and larger antennas over here, it is certain that more really good DX could be worked under average conditions if the boys would use c.w. regularly and form the habit of tuning carefully for weak c.w. signals.

The California V.H.F. Marathon sponsored by W6MVK completed its fourth period at the end of 1951. Mileage winner was W6BYE (now permanent holder of the trophy) with an aggregate of 14,820 miles covered. W6AJF and W6HZ followed with 10,700 and 5000 miles, respectively. Section awards for activity went to W6BYE, San Diego; W6HZ, Los Angeles; W6ZYH, Santa Clara Valley; W6GQZ, San Joaquin Valley; W6LOZ/6, San Francisco; W6AJF, East Bay; and W6AUO, Sacramento Valley. The expedition award went to W6WKO.

WSPYY brings us up to date on the 2-meter doings around Jackson, Mich. At present 12 stations, W8s BAN BBY FMG FRN GXE HKJ KCM KKB PYY RHB SSZ and ZNI, are active, with several more getting ready. Net roll call each Wednesday at 8:30 p.m. is followed by a standby for calls from other areas. Net frequency: 145.6 Mc. Most of the rigs presently used are 6J6-6J6-2E26 jobs running 10 to 25 watts input.

W2ZJD and W2OSS, Trenton, N. J., would like it known that they are operating nightly, Monday through Friday, on about 425 Mc. They listen for five minutes at 7, 8 and 9 p.m. At present they have 16-element arrays, and are planning to expand to 32 elements shortly.

How About the Technicians?

Much attention is being paid to the Novice, and there is no question that this class of license is having a considerable effect on the amateur picture as a whole, and certainly on the 2-meter portion of it. It is likely that before the end of the year we will have several hundred new 2-meter stations as the result of interest developing among the Novices. At the same time, we tend to overlook the Technician, yet FCC figures show 1481 Technician Class and 5746 Novice Class tickets issued in the six months of 1951 that these licenses were available.

Many of these overlap, of course; the above figures do not represent 7227 new hams, nor can it be assumed that nearly 1500 beginners obtained Technician Class licenses primarily because they expected to go on 220, 420 or some higher band. Quite a few Technicians, we must assume, are General Class applicants who couldn't quite make the grade on the 13-w.p.m. code test, but who were able to qualify on technical grounds.

But there is genuine Technician interest. "Can you give me a list of amateurs operating on 220 and 420 Mc. in Los Angeles?" (or Philadelphia, Boston, or Podunk) is a common query in Headquarters correspondence these days. More questions are coming in to the ARRL Technical Information Service asking for dope on equipment for the u.h.f. bands than heretofore. Articles in QST and talks at radio club meetings dealing with 220 and up are meeting a growing audience.

Here, certainly, is the opportunity we have been waiting for—the development of mass interest in our higher bands. Here, too, is a job for the v.h.f. clubs like the Rochester V.H.F. Group, the Two Meters and Down Club of Los Angeles, the Midwest V.H.F. Club of Chicago, the V.H.F. Institute of New York, and many other ham organizations with members active on the v.h.f. bands. We'd be happy to refer such inquiries to club groups; if you want to receive them for your area, just drop us a line. Meanwhile, we suggest that clubs hold Novice-Technician nights periodically. Spread the word around as completely as possible—your



Perhaps we'll soon be hearing of a Novice working mobile in a baby carriage, but up to now this is about the smallest mobile set-up we've come across. At a picnic of the Two Meters and Down Club of Los Angeles, W6YHP/6 used this job to amuse the spectators. Several successful contacts were made with W6MVK/6, also mobile!

may be surprised at the response.

Here are some examples of Technician possibilities: W6OJE, San Gabriel, Calif., a recent licensee, has several of his associates at Cal Tech interested in 220-Mc. work and well on their way to obtaining tickets. They are working on gear, too, and the plans include beacon transmitters and antenna and propagation experiments.

The first Technician known to have made use of his license is W2BLV, Haddon Heights, N. J., who has been working W2QED on 420 Mc. since last fall. He is also active on 145 Mc. as WN2BLV.

Up in the Boston area, W1CTW is rounding up the local Technicians and expects to have several of them going soon on 220 Mc., to augment the activity that has been maintained regularly on that band for some years.

In Collierville, Tenn., W4HHK hopes to promote activity on 220. Paul feels certain that the present DX record on 220 is but a fraction of the distance that could be covered if any of the better present-day 2-meter operators put comparable gear on 220 to that they use on 144. The same undoubtedly applies to 420—and wouldn't it be something if a couple of Technicians were the boys to turn the trick?

Technicians actually operating and those interested in getting started are cordially invited to drop ARRL a line regarding their plans. If we are ever to make anything of the amateur assignments from 220 Mc. up, this is certainly the time to get started!

OES Notes

Among several calls making their first appearance in the OES file this month is that of W9MBI, Coleta, Ill. Clare has been concentrating on 434 Mc. for some time, and on Christmas Eve he and W9ZHB celebrated completion of a year of regular contacts on this band. A 420-Mc. project at W9MBI is the construction of a crystal-controlled converter with a low-noise i.f. at 50 Mc. and another crystal conversion to a tunable i.f. system that tunes upward from 5 Mc.

W6PIV, Sacramento, who is back as an active OES after an absence of many months, describes a mobile transmitter line-up for 144 Mc. that should be of interest to those who are looking for ways to save on battery drain. Using a combination of design features of several QST articles, Ken has a 6J6 overtone oscillator-doubler and another 6J6 doubler (with two halves connected in parallel) driving an 832A final. By connecting the two 6J6s in series as far as the plate supply is concerned, these stages are operated from the 350-volt supply used on the final, with an exciter drain of

(Continued on page 116)

Happenings of the Month

LEAGUE FILES ON "RACES" RULES

In early February, by direction of the Executive Committee, ARRL's position on the proposed rules for a Radio Amateur Civil Emergency Service was filed with the Commission. It follows:

FEDERAL COMMUNICATIONS COMMISSION

In the Matter of
Providing a Radio Amateur
Civil Emergency Service } Docket No. 10102

COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE

I

Pursuant to Paragraph 4 of the Notice of Proposed Rule Making in Docket No. 10102, released December 19, 1951, The American Radio Relay League, Inc., files these comments.

II

The League notes the proposed rules with gratification and, with two minor changes indicated below, urges their prompt adoption in order that amateurs may now extend their civil defense emergency activities already being carried on throughout the country.

III

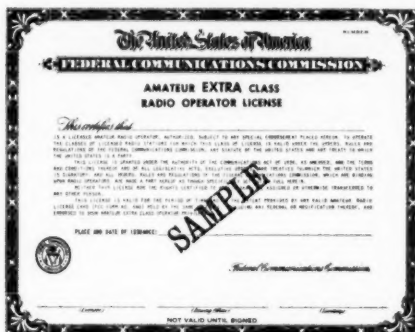
The League suggests two minor changes. The first refers to Section 12.231 (2) wherein the emissions authorized for the various bands are indicated. Current amateur privileges for the named bands above 50 Mc. include the privilege of using audio-frequency-shift-keying teletype, under the general designation of A2 carried in the amateur rules. A considerable and growing number of amateurs have availed themselves of this privilege and now constitute a sizeable body of amateurs proficient in the use of teletype operation. It appears to the League to be desirable to retain their availability in the event of civil defense emergency and the League therefore proposes that in the bands beginning at 50.35 Mc. upwards the designation 2 A2 appearing for each band in the authorized emission column be changed to 6 A2.

The second suggested change concerns sub-paragraph (c) of the same Section 12.231 (2). It is understood to be the clear intent of this section to provide for the inauguration of such joint operation only after normal amateur activity shall have been suspended because of war or other national emergency. The League proposes, therefore, that Section 12.231 (2) (c) be amended to read as follows:

At any time when normal amateur activities shall have been suspended because of war or other national emergency, these bands will be jointly available to stations in the Radio Amateur Civil Emergency Service and to stations of the military services for training and tactical operations, and, in areas where mutual interference may occur, local arrangements shall be made regarding times of drills, tests, and other training operations. In time of an actual civil defense emergency, stations in the Radio Amateur Civil Emergency Service shall have absolute priority.

THE AMERICAN RADIO RELAY LEAGUE, INC.
A. L. HUDLONG Secretary
by PAUL M. SEGAL General Counsel

February 5, 1952

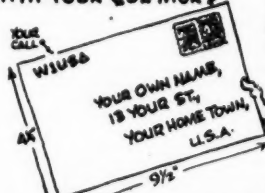


Diploma-type certificate awarded to those who qualify for the Amateur Extra Class license; it is 7 by 9 inches and suitable for framing. The actual license is still the card form, however, which is endorsed for Extra Class privileges.

CALL LETTER LICENSE PLATES

With four bills already introduced into State legislatures, the new legislative session promises to see some additional call letter license plates added to the fourteen states already granting the privilege. However, some words of caution are in order this year: from the wording of the various bills and laws, any amateur who qualifies may receive the plates for his car; Novice licensees are therefore eligible for the plates. The additional letter presents a physical problem but of more importance is the fact that Novice licensees are good for only one year and, further, that many Novices are progressing to the next highest grade of license well within that period. Wording of pending bills should take this factor into account. Secondly, the National Production Authority will be restricting sharply the manufacture of new license plates in 1953, when metal allocations will be drastically reduced. It will be well to bear this in mind in pressing for call letter plates.

IS YOURS ON FILE WITH YOUR QSL MGR?



See page 102, January QST, for the address of your QSL manager

YL NEWS and VIEWS

CONDUCTED BY
ELEANOR WILSON,* W1QON

It is said that if you want something strongly enough, you'll get it. Generally, though, more is involved than mere wishful thinking. Many girls certainly would "like" to have an amateur license, but those who "want" one do something about it.

Belief that the requirements are difficult, or lack of a technical background or a ham in the family to aid, may discourage some from going ahead, but others find these seeming hindrances not insurmountable.



Not only is Carol Coven, W8GEN, the only ham in her family, but also before getting her own license she wasn't even slightly acquainted with another ham! In the summer of 1950 she learned the code and theory and even built a rig—all

without outside aid—and in November got her ticket. Now seventeen and a high school senior, Carol has made many radio friends throughout the world, and she is thoroughly enjoying her extensive amateur activities.

Dot Seaver was not satisfied merely to watch her son, W2YUP, copy code. With no technical training nor previous knowledge of amateur radio, Dot studied by herself, passed her Class B exam, and became W4QBY. Now Advanced Class and active on twenty 'phone, she keeps regular schedules with her son, who is away at college. (Bill considers this a convenient way to QRRR for extra cash.)

Thus, the cases of only two of the many YLs who have shown what desire, interest, and persistence can do!



*YL Editor, QST. Please send all contributions to W1QON's home QTH: 318 Fisher St., Walpole, Mass.



Grateful for the many thousands of messages she has sent overseas for them, the neighbors of Clara Reger, W2RUF, submitted her name to the Mutual Broadcasting System's "Tell Your Neighbor" program. As a result of her outstanding service to her community, Clara recently received the Golden Rule award and a set of silver.

Clara's amateur activities have been extensive since 1933, when she became licensed. In 1949, '50, and '51 she made BPL seventy-five per cent of the time—she handles traffic eight hours a day, Monday through Friday. Manager of the NYS Net, alternate NC of the WNY MARS 'Phone Net, she is also a member of RN, EAN, CAN, PAN, TCPN, and ECEN—all traffic nets. She is an A1 Operator, ORS, and holds a 35-w.p.m. Code Proficiency certificate. A charter member of the YLRL, she originated the expression "33" used by members of that organization.

Top Scorers—12th Anniversary Party

Congratulations to the following winners of the YLRL 12th Anniversary Party:

'Phone Section		'C.W. Section	
W3UUG.....	3684	W1FTJ.....	2880
W1FTJ.....	3364	W3JSH.....	1501
W3QQF.....	2424	W0JTX.....	960

Keeping Up with the Girls

The Ninth District welcomes three new YL Novices—WN9OTO and WN9OTN (mother and daughter) and WN9PEX. . . . WN1UET is added to the list of Vermont YLs. . . . JA2II was formerly W4IKA. . . . On Tuesday at 10:00 p.m. EST, YLs in the vicinity of Chicago meet on 29,000 kc. for traffic-handling and rag-chewing. Interested YLs are invited to join. . . . W5UCQ helps her OM, W5KUC, issue the West Gulf Division DX Club DX Bulletin. . . . The West Seattle Amateur Radio Club surprised W7LCS and her OM, W7IYV, with a housewarming. . . . A sergeant in the WAF, W4SOA operates from Donaldson AFB in South Carolina. . . . When not hamming or tending her three jr. ops, WN6OLP serves as a nurse at a La Jolla hospital. . . . WN1UPZ has her own pilot's license and does considerable flying. . . . Purchase of a receiver they saw in a pawn shop window helped Betty and Louis Wilson become W7PTC and W7NPVW. Before Betty was stricken with polio three years ago, the Wilsons bicycled extensively throughout the country. But now ham radio takes preference, and Betty averages four hours per day on the air. . . . ZS6KK devotes much time to the Johannesburg Branch of the South Africa Radio League. . . . A fall down a flight of stairs recently bruised W8ATB but didn't stop her from continuing with the big task of 1952 YLRL nominations. . . . W8HWX and W8HUX have edited "Ham Shack Gossip" monthly for the past two years. The publication, which is sustained by donations, is of particular interest to those in the Eighth District

(Continued on page 116)

Notes on Speech Clipping and Filtering

Ideas for Increasing the Effectiveness of 'Phone Transmission

BY WARREN B. BRUENE,* W6TTK

SPEECH clipping in a crude form is probably as old as voice modulation in amateur radio. Increasing the audio gain for maximum loudness, until very noticeable distortion appeared, undoubtedly indicated that overmodulation or overloading of the audio system was taking place. That was speech clipping in a sense, but today we do it in a more refined manner to realize certain advantages and call it speech clipping instead of "heavy modulation." The most objectionable result of "heavy modulation" is splatter due to overmodulation, although the audio distortion caused by generation of high-frequency harmonics of the speech frequencies because of limiting or clipping of audio peaks, also is objectionable.

Overmodulation, Key Clicks and Splatter Filters

Splatter caused by overmodulation of a Class C amplifier is very similar indeed to key clicks. The high frequencies causing the clicks and splatter are in the sharp corners of the keyed waveform, or modulated r.f. envelope waveshape. In c.w. we round off those sharp corners by using

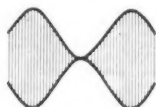
• The inner workings of clipper-filter systems don't always come up with an over-all result that you might expect. Here are the reasons why, and some recommendations as to methods that will give optimum performance.

discharge characteristics of the filter are important because they correspond to eliminating the click on make as well as on break, in c.w. language.

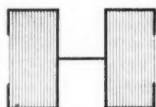
In contrast, if the peak audio swing in the modulator is limited on both positive and negative peaks, as proposed by the writer,² then the high-level filter functions mostly as a low-pass filter and the d.c. transient characteristics are of less importance.

Nonlinear Phase Shift and Low-Level Clipping

In the first commercially-built amateur gear using low-level speech clipping the clipper was followed by a single-section low-pass filter.³ The filter served to attenuate the high voice frequen-



Sine-Wave Modulation
sideband power is
50% of Carrier Power



Square-Wave Modulation
sideband power is
100% of Carrier Power



Triangular or saw-tooth
Modulation
sideband power is
33% of Carrier Power

Fig. 1 — Relationship between sideband power and modulation waveshape, for 100 per cent modulation.

key click filters. Many types of key click filters have been used, but it is worth noting that they all are designed to use their d.c. transient characteristics.

The introduction of the splatter filter¹ was an important step forward in eliminating splatter. Although the filters used were designed according to conventional audio filter equations, the writer believes that, until recently,² it was not generally known that the important splatter-filtering action is that contributed by the direct-current transient characteristics of the filter and not by the audio passband characteristics. Both the charge and

cies, microphone breath noise, and the harmonic components generated by clipping. Many thought that if some attenuation was good more would be better, so we saw many clipper-filters with three sections — usually including m -derived sections. These filters produced some real attenuation, but they had so much nonlinear phase shift that much of the value of clipping was lost. This nonlinear phase shift causes the flat top of the clipped wave to tip, and the effect is several times greater in a filter with an m of 0.6 than in a k -section filter.

The nonlinear phase shift of one m -derived or two constant- k sections is about the most that can be tolerated, and this means that the contribution (to nonlinear phase shift) by the driver and modulation transformers must be kept to a minimum. Several filter sections, or even just one filter section plus an ordinary interstage trans-

*% Collins Radio Co., Cedar Rapids, Iowa.

¹ Smith, "An Effective Splatter Suppressor," *Radio*, October, 1940.

² Bruene, "High-Level Clipping and Filtering," *QST*, November, 1951.

³ The Collins 30K-1 amateur transmitter. (The driver transformer was resonated for additional attenuation.)

former and a driver transformer, can change a flat-topped clipped wave into a sawtooth wave. Now this isn't a very good way to get maximum power in the sidebands, since the power in a triangular or saw-toothed wave is only one third the power in a square wave of equal peak amplitude! Compared with a sine wave, the triangular wave has two thirds the power while a square wave has twice the power. (See Fig. 1). So our object is to keep that flat top from tipping up very much.

Perfection is not needed when using a low-level clipper system because the clipping must be kept down to a level corresponding to 79 per cent modulation. This is because the peak amplitude of the fundamental component of a square wave is $\frac{4}{\pi}$ or 127 per cent of the peak

amplitude of the square wave. (See Fig. 2). For example, when a 2000-cycle tone is clipped heavily and passed through a low-pass filter with a 3000-cycle cut-off, the output is almost a pure sine wave. The filter in effect shaves some of the energy off the sides of the square wave and piles it up on top. Hence the clipping level must be set at or below $\frac{\pi}{4}$ or 79 per cent of the expected peak out of the filter to avoid overmodulating. Thus, tipping of a low-frequency square wave can

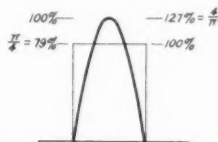


Fig. 2 — The fundamental sine-wave component of a square wave has greater peak amplitude than the square wave that contains it.

be tolerated if the rise doesn't exceed that normally anticipated — that is, from the 79 per cent clipping level to the 100 per cent modulation level. A single-section low-pass filter, plus driver and modulation transformers with good low-frequency response, will stay within the required nonlinear phase shift limits. A simple k -section filter should be used because its nonlinear phase shift is much less than that of m -derived sections. Also, the attenuation is better farther out, which is important. The use of filter inductors with Q s in the range of 10 to 25, rather than high- Q toroids, gives improved phase linearity near the cut-off frequency.

The low-frequency response of all the stages following a low-level clipper should be as flat as possible down to at least 150 c.p.s., to avoid too much nonlinear phase shift. This means large coupling condensers and either good transformers or the elimination of all interstage and driver transformers entirely. The driver transformer is the weakest point in most Class B modulators, and the writer advocates their elimination. The simplest method of accomplishing this is to use beam power tetrodes operating Class AB₁ as modulators. The tube cost is more, but you make

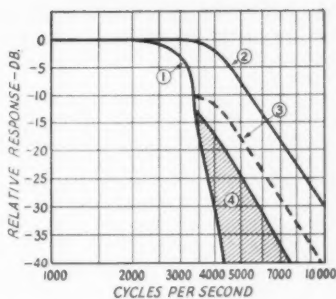


Fig. 3 — Curve 1, response of 2-section filter ahead of clipper; Curve 2, response of high-level filter with 4000-cycle cut-off; Curve 3, theoretical maximum level of distortion components arising from clipping. The shaded area, 4, shows the region in which distortion components actually fall when using 10 db. of clipping.

it up in other parts savings. The writer uses a direct-coupled cathode-follower driver and triode modulators with excellent results, but these circuits are a little tricky to design. Of course, an easy way around this requirement is to do the clipping right in the modulator stage.²

Holding down the clipping level to 79 per cent to avoid overmodulation takes a good slice off that 2- or 3-to-1 power advantage we mentioned. The splatter filter or the high-level clipper and filter² do not have this disadvantage, which is a point in their favor. The disadvantage of the splatter filter is that on the negative modulation peaks the filtering action is not as good because the harmonic attenuation is contributed by the d.c. transient characteristics of the filter rather than by its audio-frequency characteristics. Again the writer recommends the straight k -section filter over the m -derived filter as being better in this regard also.

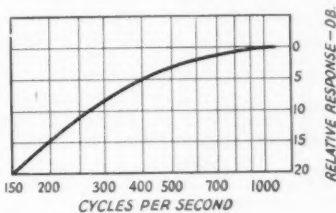


Fig. 4 — A desirable low-frequency response curve.

High-Frequency Attenuation Requirements

Actually, we should have more high-frequency audio attenuation than a single-section filter will give. If an audio oscillator and an oscilloscope are available to check the transmitter, two filter sections can be used following the clipper, if everything else is good enough, but otherwise it is better to use just one filter section after the clipper. The place to put the extra filtering is ahead of the clipper. A two-section filter will do a very good job of attenuating the audio fre-

quencies above 3000 c.p.s.,⁴ but a single-section filter with an m of 0.8 will do an adequate job also, since it gets some help from the filter following the clipper.

With adequate filtering ahead of the clipper about all the filter following the clipper has to do is to clean up the high frequencies generated by the clipper. This is fairly easy to do since in a square wave the third harmonic is one third, the fifth is one fifth, and the seventh is one seventh the amplitude of the fundamental. These ratios correspond to about 10 db., 14 db., and 17 db. down, respectively, before filtering. Fig. 3 shows the attenuation curve of a k -section low-pass filter and the maximum amplitude of the spurious frequencies. Careful measurements using 10 db. of clipping, a low-distortion r.f. detector, and a wave analyzer showed that these spurious frequencies actually are substantially below this and fall within the shaded area in Fig. 3.

Low-Frequency Response

In order to keep the speech signal so it sounds well, the low frequencies, also, should be attenuated. Proper low-frequency attenuation not only gives the signal better balance but also attenuates the strong low vowel frequencies so they don't need to be clipped as much to get the higher consonant frequencies up to 100 per cent modulation. A low-frequency attenuation rate of about 6 db. per octave below 500 or 800 c.p.s., as shown in Fig. 4, has been found to be a good choice.⁵ The rate of attenuation can be increased below 150 or 200 c.p.s., if desired. Attenuation of 6 db. per octave is easy to obtain by using small coupling condensers of the proper value ahead of the clipper. If a Chicago Transformer LPF-1 low-pass filter is used ahead of the clipper, a 0.01- μ f. coupling condenser into it will give the desired response curve. If you think this is too much low-frequency attenuation, you should see the response curve of the standard telephones.⁶ They have roughly 6 db. per octave drop below about 2000 c.p.s. and cut off sharply below 300 c.p.s.

Preclipping Overload

The overload characteristics of the stages ahead of the clipper must be watched, particularly if clipping is done at high level. The signal level ahead of the clipper may be several times the 100 per cent modulation or clipping level, and this may overload some stage. This does no harm if the stage overloads equally on both positive and negative swings, and if no undesirable spikes appear on the waveform. When the clipping is done in the modulator stage the driver will overload soon after clipping starts. Actually, this is desirable, but it is worth checking.

How Much Clipping?

Speech clipping, like most good things, should be used with moderation. Six to 10 db. of clipping

on the peaks is enough. It will give your signal about twice the punch and still sound pretty clean. For the weak ones, it will help to talk a little louder, but you can push the microphone back a little for the "locals."

To summarize, the writer recommends the following:

- 1) Use a single k -section filter and flat low-frequency response design following either a high-level or low-level clipper, to keep the top and bottom of the clipped wave flat for maximum sideband power.

- 2) Place an additional low-pass filter ahead of the clipper for speech filtering so that the filter following the clipper need only clean up the high frequencies generated by the clipper.

- 3) Attenuate the low frequencies 6 db. per octave, starting at 500 to 800 c.p.s., for proper balance and less need for heavy clipping.

- 4) Make sure the stages ahead of the clipper have adequate swing capability or clean overloading characteristics for input signals up to at least four times that required for 100 per cent modulation without clipping.

In conclusion, the writer believes some form of properly functioning speech clipping is the best single investment one can make in a 'phone transmitter. There are several pitfalls, however, which must be guarded against and this undoubtedly explains why many have had poor success. A 'scope and an audio oscillator are invaluable in checking clipper performance. The writer does not favor those circuits which either slam in 12 db. of clipping or cut it out entirely. Leave the clipper in all the time and don't hit so hard. Just advance the speech input gain to the point where distortion becomes noticeable, but not objectionable.

HAMS AT HEADQUARTERS

WIAW, ARRL Headquarters Station

The following calls and personal sines belong to members of the Headquarters gang:

WIBAW	R. T. Beaudin, "rb"
WIBDI	F. E. Handy, "fh"
WIBUD	A. L. Budlong, "bud"
WICEG	H. M. McKean, "mac"
WIDF	George Grammer, "gg"
WIDJV	Harry Paston, "hp"
WIDX	Byron Goodman, "by"
WIFTX	R. M. Smith, "ds"
WIFWH	W. E. Bradley, "wb"
WIHDQ	E. P. Tilton, "ed"
WIICP	L. G. McCoy, "lew"
WIKE	Richard L. Baldwin, "ike"
WIJEQ	C. V. Chambers, "vc"
WIJMY	J. A. Moskey, "joe"
WILVQ	John Huntoon, "jh"
WIMFA	H. K. Isham, "hk"
WINJM	George Hart, "geo"
WIIQS	Murray Powell, "mp"
WIRWS	John E. Cann, "jc"
WITS	D. H. Mix, "don"
WIVG	L. A. Morrow, "pete"
W2VMX/1	C. L. Wood, "chas"
W9BRD/1	Rodney Newkirk, "rod"

⁴ Chicago transformer LPF-1, for example.

⁵ Technical Topics, "Frequency Response and Intelligibility," *QST*, November, 1950.

⁶ Bell Laboratories Record, Sept., 1951, p. 417.

On the Air *with* SINGLE SIDEBAND

THERE are now two active manufacturers of s.s.b. transmitters, so if you have been waiting until you could buy a rig, you no longer have any excuse for not being on the air. Paul of **W9OHM** sells a voice-controlled rig that uses a crystal filter and ends up on 75 with provision for another 807 if you use another power supply. Wes of **W9DYV** offers a phasing job on 9 Mc. with mixing that gives 6AG7 output on any band from 10 to 160, with crystals or an external VFO for the frequency control. Voice control is optional. The exciter is offered either wired and tested or in kit form.

A new big signal on 75 that many of the gang have worked is **KH6UL**. John has 800 watts running nicely and has worked **W2EWK**, **W2JJC**, **W2NJR**, **W2TTO** and **W8FSA**, plus plenty of W6s, W7s and W9s. **KH6UL** is ex-**W6CTU**, and the rig is a **W1JEO** exciter and a

the loudspeaker. My present problems center around the choice of receiving methods. So far, I have played with the use of crystal-lattice filters in the receiver in conjunction with the balanced-modulator-detector receiver described in the April, 1948, *QST*."

W3UR in Harrisburg built a **W1JEO** exciter and wasn't satisfied with the low output he got. One little thing that helped to bring it up was the substitution of 0.01- μ d. ceramics for the 0.1- μ d. papers in the 6K8 circuit, and it also helped on the crystal-oscillator starting time. Other items that helped in the alignment were a homemade v.t.v.m. and a limited-range VFO.

Florida was put on the s.s.b. map by **W4ORB** (ex-**W8TKM**) and **W4QN**. They both use **W1JEO** exciters — **ORB** runs 100 watts to a pair of 807s, and **QN** kicks an 829 to 75 watts. Good reports have been received from the East Coast and the Middle West, and both agree that "Single Sideband is tops."

Remember how proud we were in 1950 to announce that **W2URX** on s.s.b. was only 17 years old. Well, old graybeard Denny will have to look to his laurels, because **W4MKT** in Winston-Salem is only 15 years old! We don't have any dope on his rig, but we hear that he succumbed to the siren cry of s.s.b. only after



The Central Division Convention last year drew quite a few of the s.s.b. gang. Here are, from left to right, **W8VNG**, **W8JRM**, **W9OHM**, **W9UIT**, **W9MO**, **W9PHV**, **W8IQI**, **W8CJG**, **W9BVL**, **W8JYU** and **W9EKL**. (Photo courtesy **W9BVL**)

pair of 810s. A full-wave antenna helps to insure that the Stateside boys get the best possible signal from the land of the lei.

Delaware showed up when **W3ATV** checked in with the gang. His exciter is a Weaver-Brown crystal-lattice affair (aligned primarily with a broadcast receiver) and at present ends up with a pair of 814s running up to a half kw. To quote part of his letter, "... I have been repeatedly amazed at the reliability of low-power s.s.b. signals, especially under conditions of fading. After getting over the initial thrill, I am quite impressed with the use of voice control and now have the system operating in conjunction with

several very successful years on v.h.f. Since one has to be an engineer to get a s.s.b. rig going (as you have no doubt heard), that must make Paul the youngest engineer in the country.

Dr. Schwalbe, **W4VP**, in Louisville, Ky., has a **W1JEO** exciter and a pair of **AB1 807s**. In only a few hours on the air he worked 12 states and both coasts, and says, "How those fellows can hear my peak power of only 50 watts is a constant source of amazement." Like so many others, he got much of his hope from the *QST* articles and from "reading the mail" on the high end of 75, and he also feels indebted to fel-

(Continued on page 118)

Capacitance Meter for Small Values

A Simple Gadget for Checking Fixed Condensers

BY S. A. SULLIVAN,* W6WXU

• In this article, W6WXU describes a simple meter for checking small condensers. Since the unknown is connected across a fixed condenser in series with the calibrated condenser, measurement is not limited by the capacitance of the latter, and the calibration at the low-capacitance end of the scale is opened up.

MORE and more amateur circuits these days call for the use of small capacitors of 2000 μfd . or less, even in by-passing applications. Although the larger capacitors are usually clearly and completely labeled, most small sizes are identified only by a color coding which is frequently faded or covered with dirt and wax. Furthermore, it is not always apparent which of several code systems was used in marking the capacitor.

Having an innate mistrust of color codes anyway and not possessing a bridge, I built the little gadget described here especially for checking small capacitors. It covers the range 0 to 10,000 μfd . with sufficient accuracy (10 per cent or better) for most purposes. In addition, it is small and uses very few parts. It requires no accessory equipment. A flip of the switch and it is ready to go with no heating time.

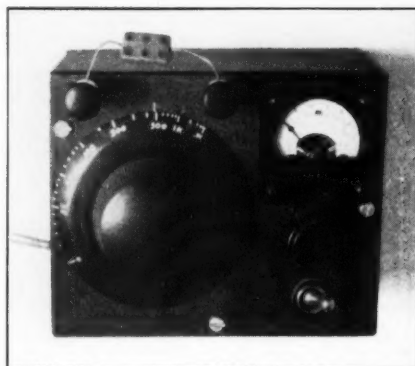
As can be seen from the circuit diagram of Fig. 1, it uses a built-in grid-dip meter coupled to the measuring circuit, L_1 , C_1 , C_2 , and C_3 . In use, the oscillator is adjusted by the trimmer, C_4 ,

to the resonant frequency of the measuring circuit (C_1 at full capacitance), as indicated by a dip in grid current. Then the unknown capacitance is connected across C_3 , and C_1 is backed off until the meter again shows resonance. The unknown capacitance is then read directly from the dial on C_1 . The calibration of this dial is shown in Fig. 2. Unlike most bridges and capacitance meters, the scale is spread out more at the low-capacitance end. The first half inch of scale length covers 0 to 5 μfd .

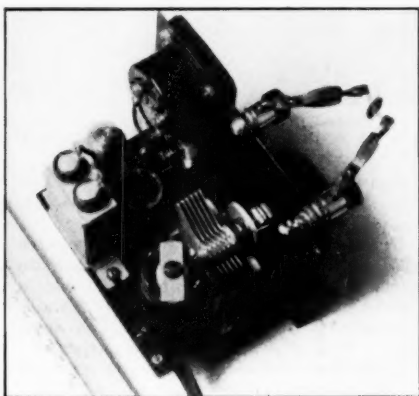
The circuit is simple and uses readily-obtainable parts. Everything fits easily in a $3 \times 4 \times 5$ -inch box. A.c. is used directly on the plate of the 3S4 oscillator tube, and the filament is heated by the reactive current through a 1- μfd . condenser connected in series with the line. Thus, power consumption is confined to just the 1 or 2 watts used directly in the oscillator itself and heating is held to a minimum. Any meter with a 1- or 2-ma. scale will serve, since all that is required is an indication of grid-current change. The one used here happens to be a 2-ma. war-surplus item. All parts of the oscillator circuit are insulated from the chassis for obvious reasons. C_7 was added to cure a slight hand-capacitance effect.

Reasonable care should be used to make everything solid, particularly in the measuring circuit, so that it will hold calibration. The frequency used is not important, and any convenient coil size may be used. The only important requirement is that both circuits tune to the same frequency. This particular unit operates at about 4500 kc., which is a fair compromise between

* Route 2, Box 400 E, Sonoma, Calif.



The capacitor checker is built in a $3 \times 4 \times 5$ -inch box. The knob under the meter is the control for the g.d.o. tuning condenser. The condenser to be checked is connected across the two binding-post terminals above the calibrated dial.



Interior view of the capacitance meter. L_1 and C_1 are in the foreground. Behind the milliammeter are the 3S4, L_2 and C_2 . C_4 is below the meter.

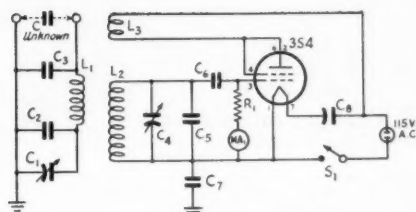


Fig. 1—Circuit diagram of the simple capacitance meter.

- C₁—100-μfd. variable.
- C₂—45-μfd. ceramic.
- C₃, C₅—100-μfd. ceramic.
- C₄—25-μfd. variable.
- C₆—15-μfd. ceramic.
- C₇—500-μfd. mica.
- C₈—1-μfd. 600-volt paper.
- R₁—30,000 ohms, ½ watt.
- L₁, L₂—Any convenient size; see text.
- MA1—D.C. milliammeter, 1- or 2-ma. scale.
- S₁—S.p.s.t. toggle.

coil size and oscillator stability. Any 100-μfd. variable can be used for C₁, but the straight-line-frequency type used here gives a better spread on the low-capacitance end of the scale. C₂ spreads the high-capacitance end of the scale. The two coils should be placed no closer than necessary to give a readily discernible dip on the meter.

As always with home-constructed equipment, the weak point in appearance is dial marking and panel labeling. The dial shown is from an ancient receiver. It was mounted on a piece of ¼-inch rod, chucked in an electric hand drill, and the original markings taken out with sandpaper. The new calibration was made with white ink and a fine pen. This is not too satisfactory, but it does have the advantage that mistakes are easily corrected. The instrument is calibrated by con-



Fig. 2—Dial scale of the capacitance checker showing how the scale is opened up at the low-capacitance end.

necting capacitors of known size, or combinations thereof, and marking the dial at the grid-dip point.

The meter was built primarily to measure capacitors before they are used. However, a fairly close measurement can be made on capacitors already wired into a circuit without disconnecting them. Connect a pair of test leads to the meter and connect the grounded lead to one side of the capacitor. Before connecting the other lead, rotate C₁ to the dip and read the lead capacitance. Then connect to the unknown capacitor and again rotate C₁ to the dip. Subtract the lead capacitance from the total to find that of the unknown. Do not balance out the lead capacitance by readjusting the trimmer.



Electronic Units Commended

The achievements of the following Naval Reserve Electronics Units from the standpoint of training, personnel, and administration have been recognized by Letters of Commendation from the Chief of Naval Personnel.

Organized Electronics Company 1-1 (K1NRA), Malden, Mass.

Organized Electronics Company 8-2 (K5NAN), Harlingen, Texas

Volunteer Electronics Company 12-6 (K6NRM), Modesto, Calif.

Volunteer Electronics Platoon 12-18, Ukiah, Calif.

Organized Electronics Company 13-5, Medford, Ore.

Organized Electronics Battalion

Things have been happening in Great Falls, Mont. Originally Volunteer Electronics Company 13-23 (K7NAQ), the Great Falls unit had grown to seam-breaking size (23 officers, 110 enlisted personnel). With the green light from the Navy Department, Great Falls built up even more steam and produced a sufficient number of officers and men for a Battalion Staff and two Organized Electronics Companies. Thus the first Naval Reserve Organized Electronics Battalion was born.

Notes

The first Naval Reserve Electronics Company in the Sixth Naval District to attain organized status is the unit at Anderson, S. C., which is now Organized Electronics Company 6-4. C. J. Walker, jr., RM2, USNR (W4SSN) has reported to this activity as stationkeeper.

Every day is hamfest day at NDF/W5USN, Eighth Naval District Reserve master control station. All operator and maintenance personnel associated with that station are licensed amateurs: W5s EGX LNU RCZ SPL SPZ TZV; WN5s UEO UEP UTY UNF.

In addition to the above, the following amateurs in active military service are filling billets in connection with the Naval Reserve Electronics Program: W1s NK SGC; W2s BBH FCE; W3s CH GUF STJ; W4s BIH BL EF IA KQD LW MYV ODA PPC QEL RCQ RQR RPI SEE SRL SSN; W5s HNW PLQ SKG; W6s BOM BVY GYI GYJ IQS MRS VHE VWF K6DL; W7s CQK DTL NAK NSE OMT; W8s CLT DIT DSD KOX; W9s AKP FDC; W0s DJE DKV.



J. M. Black, ALC, USNR, W0UUI, at the controls of K9NAG. This station is operated by members of Naval Air Reserve units, Naval Air Station, Minneapolis.



Hints and Kinks

For the Experimenter



3-WIRE 6-12-VOLT SYSTEM AS A MOBILE POWER SOURCE

MUCH of the surplus gear available was designed for 12-volt d.c. operation. To take advantage of this situation without having to rebuild the equipment, an extra generator, regulator, and 6-volt battery are used in the circuit shown in Fig. 1.

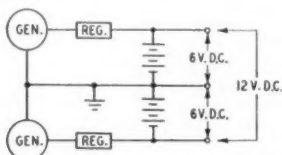
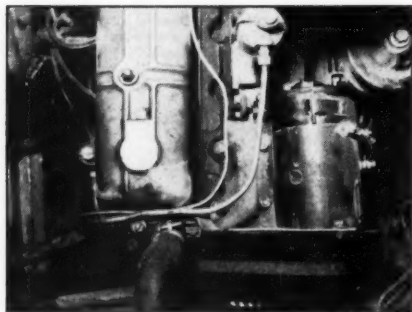


Fig. 1 — A 3-wire 12-volt system for mobile power supply that permits use of surplus gear without modification.

Preferably, the extra components should be identical to those already installed in the car, except the regulator, which must be one designed for the opposite polarity, and for the particular generator used. Distribution of the power can be almost any way desired, although it is suggested that the starter be run from one 6-volt battery, and the rest of the load off the other.



The photograph shows the method used to install the extra generator in a 1948 Chevrolet. The plate that supports the generator bracket is fastened on with modified head bolts. There are nuts underneath the plate against the head. The generator rests close to the intake manifold, and is also supported by a brace from the water outlet. The brace for the original generator has an extension welded onto its brace. The regulator is mounted on the sheet metal side a little below and to the rear of the oil filter. A bonding strap is run between the generator and regulator. The extra battery is mounted in a cut-down Plymouth

battery carrier under the front seat. — *K. B. Karns, W0MYH*

QUIET OPERATION OF RELAYS

THE clank and clatter of relays is both annoying and unnecessary. Most of the noise can be eliminated by the simple, effective method of mounting described below.

The relay is mounted on a strip of discarded carpeting about 5/16 inch thick and somewhat larger than the bakelite base of the relay. Mount the relay equidistant from all edges of the carpeting by passing machine screws, with flat washers next to the heads, through the carpeting and the relay base so that the nuts and the lock washers will be against the base. Now take a second piece of carpeting the same size as the first and place it against the back of the assembly, sandwiching the heads of the machine screws between the two pieces.

To fasten the unit to a chassis, cut two strips of aluminum about 1/2 inch wide and long enough to cover the full width of the carpeting, and use them as hold-down plates, one at each end of the carpeting. Pass machine screws through the aluminum strip, the two layers of carpeting, and the chassis.

As an example of the effectiveness of this system of mounting the writer uses two keying relays mounted in a metal box. They cannot be heard when wearing earphones, even though they are only a couple of feet away. — *Rev. Joseph A. Terstege, W9LQE*

MOBILE RECEIVING HINT

IN MANY mobile installations the transmitting antenna, mounted at the rear of the car, is used as receiving antenna as well, instead of using the original receiver antenna. To do this it is usually necessary to run a long lead from the rear of the car up to the receiver. If this lead happens to be a high-capacitance affair, it may add enough shunt *C* across the receiver input terminals to detune the r.f. stage far beyond the range of the antenna trimmer provided in the set. If this is the case, the sensitivity of the receiver will seem lower than when the original antenna is used.

A simple cure is to put enough fixed capacitance in series with the antenna lead to limit the effect of the shunt *C*. At W1KDK/A1KDK, a 200- μ fd. tubular ceramic condenser effected the cure. With this condenser in series with the center conductor of the RG-59/U cable used to run between the whip and the receiver it was again possible to peak the antenna coil in the receiver, restoring it to its original sensitivity. — *Theodore Simmington, jr., W4JOT/A1JOT*



Correspondence From Members -

The Publishers of *QST* assume no responsibility for statements made herein by correspondents.

LONG BEACH GRANDPAPYS

237 American Ave.
Long Beach, Calif.

Editor, *QST*:

... It is my sincere feeling that we old timers have each of us given something to bring amateur radio, as well as the development of electronics, to its present high esteem and development.

— Cecil D. Wältia, W6FE

4344 Greenbrier Road
Long Beach, Calif.

Editor, *QST*:

February *QST* just in! What goes — four letters objecting to the grandpappy-armchair ruling of FCC! None favoring it. What's [the] matter — none of you fellers at Headquarters that old! And a suggestion that it be put to a vote!

How soon the younger generation (*et tu, Brute*) forget the men who pioneered this here wireless.

... Let's see *QST* uphold its reputation for impartiality and give the other side a break.

— F. I. Phippeny, W6CK

1206 Maple Ave.
Los Angeles, Calif.

Editor, *QST*:

The W6AM Extra Class license is a grandpappy license, dated the first day available, January 2, 1952, but these are also valid: Radiotelegraph First and Radiotelephone First — they hang on the shack wall, too. ...

Please don't be too hard on the few old grandpappys who tussled so hard to get amateur radio going, and who then knew, almost by heart, the only radio textbook available.

— Don C. Wallace, W6AM

QST COVER

Glastonbury, Conn.

Editor, *QST*:

I very much enjoyed the cover on *QST* for December. I think it must be a "posed" picture, though — I don't believe that even Brother Goodman's bench *always* looks that clean. If it does, then he should have a picture of my bench and write an article on "How Not To Build a Transmitter." On second thought, I wonder if the condition of my bench has anything to do with my not being on the air. ...

— Warren N. Doubleday, WN1UJA

HANDBOOK

109 Indiana Ave.
Morton, Ill.

Editor, *QST*:

... Recently I took and passed the exams for a commercial radio operator license. ... During my studying I could not find the necessary material I desired to clarify several subjects that came up. These are usually covered just briefly in study material available for this. Naturally, being a licensed amateur, I turned to the ARRL *Handbook*. I found all the material I needed, written in such a way that I was able to understand it fully. ...

— Albert Russell Krug, W9QFV

445 Dalzell St.
Shreveport, La.

Editor, *QST*:

It is with considerable disgust that I saw the circuit diagram on page 260 of the 1951 *Handbook*. There is absolutely no justification for the use of miniature tubes in this circuit. The argument of being modern does not hold

water, especially considering that some of our manufacturers of quality equipment have not fully accepted them and at least one large manufacturer has abandoned their use.

Particular care should be exercised by the editors of this book to be sure of including only quality equipment, especially since many people use circuits directly as printed and many beginners form their ideas of what is suitable and unsuitable from the circuits you print.

— James L. Streiff

BOOTLEGGER AT LARGE

Editor, *QST*:

Ed. Miller, W5MSG, OO, of Albuquerque, has advised that he heard a station operating on both 14- and 28-Mc. 'phone during the 1951 Sweepstakes, using the call "W5CA, Tijeras, New Mexico." The station was heard on Nov. 24th and 25th. This station was actually operating and participating in the contest as W5MSG reported that he heard "W5CA" transmit 88 messages. Another Albuquerque amateur heard a W8 in contact with this "W5CA, Tijeras, New Mexico" on the 25th on 28-Mc. 'phone.

The real W5CA did operate in the 1951 88, but solely on c.w.

I would be appreciative of any reports from any station who contacted this bootlegger who was operating in the 88 using my call, W5CA, on the 'phone bands. Any information will be helpful.

By the way, if this bootlegger worked VE8, I would be glad to know of it, as that is the only section I missed!

— A. David Muddleton, W5CA

GOOD OLD A.R.R.L. . . .

1501 Pine Knoll Lane
Mamaroneck, N. Y.

Editor, *QST*:

After playing around for lo these 30 years with radio I finally got up enough courage to go for my amateur license — and now I am WN2FBE.

And there is no question but that for *QST* and the ARRL I would never have made it. The magazine itself is absolutely indispensable for any one in amateur radio . . . and without the ARRL slow-speed code practice I would still be floundering around 3 w.p.m. I am still copying it and hope to go for my General Class ticket in a month or so.

Darn it, I had to buy a new larger hat . . . the old one won't fit.

— William B. Sullivan, WN2FBE

Huron Terrace
Kincardine, Ont.

Editor, *QST*:

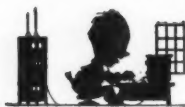
I cannot understand those who complain of costs of ARRL membership or the services rendered. If they would discard their dog-in-the-manger attitude and explore even a few of the many possibilities ARRL offers, they would be amazed as I am at how so much can be had for so little.

— R. Lautenslager, VE5ATR

1414 Oakley St.
Orlando, Fla.

Editor, *QST*:

The article on by-passing, April, 1951, *QST*, is directly responsible for curing a nasty case of super-fringe area TVI — for which I cannot adequately express my thanks. This is a 150-mile fringe of Jacksonville, Florida, TV and people
(Continued on page 120)



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
JOHN E. CANN, WIRWS, Asst. Comm. Mgr., C.W.
GEORGE HART, WINJM, Natl. Emerg. Coordinator

J. A. MOSKEY, WJMY, Deputy Comm. Mgr.
L. G. MCCOY, WICP, Asst. Comm. Mgr., Phone
LILLIAN M. SALTER, Administrative Aide

Speaking of Appointments. All amateurs qualified and interested who have been licensed for a year or more are eligible to be considered by SCMs for an appropriate ARRL (Official Station) appointment. All *not* currently participating in operating organization through activity or appointment-holding are invited to consider doing so. Section c.w. and 'phone nets offer fraternalism, at the same time they constitute the means to communicate by radio and handle record communications to as many cities and towns as can be covered in each state. Consistent operating in these nets helps one's procedure and marks him as more than a casually interested man. To all and sundry may we suggest that no engraved invitation to net participation is needed or will be provided. To knock on this door just note the section frequency used in the Net Directory in this and earlier *QST*'s; report to the NCS as you hear others do at the time and spot in the band indicated, and you're in the net. It's a good idea after getting the hang of the net operating pattern to use the net facilities and connections to NTS by starting off a message or two to friends that may be out of the immediate circle. Now this isn't to say that the net is by any means the whole story in getting ORS, OPS, or other appointment; those are available only to members who meet the qualifications set down in *Operating an Amateur Radio Station*, and this, except for OES, after a whole year of licensed experience.

What you are doing in a radio way is in any event of regular interest to your SCM (address

page 6, *QST*). When you have reported some real communications handling activity, you will not find him unwilling, but glad to consider your application for one of the station appointments. With or without such appointment there's a section net certificate, which may be earned, and usually requires the recommendation of your RM or PAM, as the case may be. A booklet describing all the appointment requisites, in addition to the year-of-licensed experience (which can be waived on v.h.f. applicants for OES), is available to members on receipt of radiogram or postal card request. Note the fields for participation in the following list:

- EC * Emergency Coordinator. Organizes amateurs of a community or other area for emergency radio service; liaison with officials and agencies served; also with other local communication facilities.
- ORS Official Relay Station. Traffic service, operates nets and trunk lines.
- OPS Official 'Phone Station. Voice operating, example in setting operating standards, activities on voice.
- OES Official Experimental Station. Experimental operating, collects reports v.h.f.-u.h.f.-s.h.f. propagation data, may engage in facsimile, TT, TV, etc., experiments.
- OBS * Official Bulletin Station. Transmits ARRL and FCC bulletin information to amateurs.
- OO Official Observer. Sends cooperative notices to amateurs to assist in frequency observance, insures high-quality signals, and prevents FCC trouble.

*Available where SCM determines vacancies exist. Ask your SCM.

Suggested Mobile Net Operating Procedure.

Mobile operational procedure for nets has been and is being evolved in the school of hard knocks. The following is from suggestions of the Oakland Civilian Defense Mobile Gang (3995 kc.). They were edited by W6BS, appearing in *SARO News* (S. F.). Introduced in practical operations, the points have already proved decidedly helpful and so we have no hesitation in passing along notes on this subject early in the '52 operating season. A good mobile operator will:

1. Listen for at least one minute when going on air (*not* to jam a round table or net operations in progress.)
2. Minimize transmitting *all* calls involved in a net each time he gets his turn. FCC demands that in a round table you identify yourself and station you are contacting at least once in 10 minutes. The ensuing break in operating need not be cluttered with call letters, i.e., "W6NTU and the gang, this is W6UHM/Mobile," after delaying two seconds to allow break-ins.
3. Ask the control station or other stations on a channel for permission to tune up day or night.
4. Identify by call whenever tuning, day or night.
5. In a large net or round table quickly pass the channel along to the next station.
6. Self-limit transmissions to two minutes. This helps keep up the interest for all and makes for a snappy list. Don't be an air hog.

A.R.R.L. ACTIVITIES CALENDAR

Mar. 7th: CP Qualifying Run — W6OWP
Mar. 14th-16th: DX Competition (c.w.)
Mar. 17th: CP Qualifying Run — WIAW, W6TQD
Apr. 5th: CP Qualifying Run — W6OWP
Apr. 12th-13th: CD QSO Party (c.w.)
Apr. 15th: CP Qualifying Run — WIAW, W6TQD
Apr. 19th-20th: CD QSO Party (phone)
May 4th: CP Qualifying Run — W6OWP
May 14th: CP Qualifying Run — WIAW, W6TQD
June 6th: CP Qualifying Run — W6OWP
June 7th-8th: V.H.F. Contest
June 19th: CP Qualifying Run — WIAW, W6TQD
June 21st-22nd: ARRL Field Day
July 12th: CP Qualifying Run — W6OWP
July 18th: CP Qualifying Run — WIAW, W6TQD
July 19th-20th: CD QSO Party (c.w.)
July 26th-27th: CD QSO Party (phone)

7. Wait two seconds before transmitting (all around) so that breaking stations have a chance to sign in or out.
8. Think twice before calling a weak DX station while in a round table of more than four stations. Attempts at such contact may result in complete disruption of a round table. . . .
9. Operate utilizing control station and directed net instead of free net procedure on most occasions when more than five stations are in the net.
10. Break the net, identifying with his call letters. (The procedure for breaking given in the January '52 ARRL 'Phone Bulletin to PAMs and OPS . . . two short carrier breaks for "please stand by as soon as possible, not urgent," and three times similarly, meaning "please stand by at once, urgent.")
11. Check out of net where possible during a waiting period to speed up operations, reporting in at a convenient break when he returns.
Practice the Golden Rule.

Let's Work Some DX. All amateurs are cordially invited to take advantage of our ARRL International DX Competition to work or try for some new countries. Advance notices were sent by ARRL to rare DX as well as to all foreign amateur societies. Some tips: (1) Listen for DX stations instead of calling. If you can't hear the station you can't work the station as a rule. (2) Be sure to keep in your frequency band limits to avoid disqualification. (3) Observe any tuning instructions of the DX. These are usually in the form such as 25 U or 20 D (for number of kc. up or down) or may consist of HM, LH (high-to-middle, low-to-high, etc.) indications. (4) It is worth while of course to spend some time under contest-supplied incentives to get your apparatus adjusted to peak performance, new antennas up, etc. Such efforts will continue to produce for you during the whole year of operating, and the immediate results of a station check-over are sure to be gratifying. A good antenna is half the battle. Using the same antenna for receiving and transmitting increases the likelihood of contacting more of the stations you can hear. It is not generally so profitable to send CQ DX unless you reside in DX territory. The general call falls more or less on deaf ears when W/VEs are already calling the specific DX and there are less numerous DX stations, making domestic competition keen and putting the DX in the drivers seat. Careful monitoring pays off . . . listening before calling permits timing your calls to best effect. Good hunting in the March periods of this annual ARRL DX Test! — F. E. H

CODE-PRACTICE STATIONS

The following stations are transmitting code practice in the ARRL Code Practice Program:

W2FSL, Adolph F. Elster, 53 Commercial Ave., Avenel, N. J. 3675 kc., daily at 0730 to 0900 EST.

W2JZX, Viola Grossman, 18 Phipps Ave., East Rockaway, N. Y., 3805 kc., Mon., Tues., Thurs., 1100 to 1130 EST.

W3PZA, Karl R. Medrow, USNREF W-1, 930 "H" St., Washington, D. C., 3750 kc., Friday, 2100 EST.

W4NVU, Dade Radio Club, Charles J. Bolvin, 2207 S. W. 28th St., Miami, Fla., 3697 kc., Monday through Friday, 1930 EST.

W6JZ, Ray Cornell, 909 Curtis Ave., Albany 6, Calif., 3590 kc., Mon., Wed., Fri. at 1845 PST.

Additional volunteers are needed to send code practice by radio. Schedules may be arranged to suit your convenience. Suggestions for conducting code practice are available from the Communications Department. Drop us a postal card indicating your interest and we'll send the details.

CODE-PROFICIENCY AWARDS

Have you received an ARRL Code Proficiency Certificate yet? Twice each month special transmissions are made to enable you to qualify for the award. The next qualifying run from WIAW/W6TQD will be made on March 17th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters. Frequencies of transmission from WIAW will be 1887, 3555, 7120, 14,100, 28,060, 52,000 and 146,000 kc. W6TQD will transmit on 3534 kc. The next qualifying run from W6OWP only will be transmitted on March 7th at 2100 PST on 3590 and 7248 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the five speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from WIAW each evening at 2130 EST. References to texts used on several of the transmissions are given below. These make it possible to check your copy.

Date	Subject of Practice Text from January QST
Mar. 3rd:	<i>Practical Application of Pi-Network Tank Circuits for TVI Reduction</i> , p. 10
Mar. 5th:	<i>Three Channels on Ten</i> , p. 16
Mar. 11th:	<i>FCC's Plan for Handling TVI</i> , p. 22
Mar. 13th:	<i>Adding an Amplifier to the Novice One-Tuber</i> , p. 25
Mar. 19th:	<i>R.F. Amplifiers for 420 Mc.</i> , p. 28
Mar. 21st:	<i>75-Meter Mobile, California Style</i> , p. 32
Mar. 25th:	<i>The World Above 50 Mc.</i> , p. 45
Mar. 27th:	<i>Let's Go High Hat</i> , p. 52

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH.....244	W8YXO.....237	W3GHD.....231
W8HGW.....241	W6ENV.....235	W2BXA.....230
W3BES.....241	G2PL.....235	W3KT.....230
W6VFR.....238	W3CPV.....232	

RADIOTELEPHONE

W1FH.....212	XE1AC.....207	W1JXC.....192
PY2CK.....208	LU6AJ.....202	W1NWO.....192
VQ4ERR.....207	W8HGW.....197	W2BXA.....188
	W9RBI.....195	

From December 15, 1951, to January 15, 1952, DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued to the amateurs listed below.

NEW MEMBERS

FA8DA.....155	VK3YL.....105	W1SU.....102
SM5CO.....112	FN8B.....103	DL1CR.....101
W7NKW.....110	ON4JU.....103	VQ4KRL.....100
ZL3OA.....107	SM5FA.....103	VE3OR.....100
	GM2DBX.....103	

RADIOTELEPHONE

W8GZ.....145	GM2DBX.....102	W6ZTW.....100
	GWSBW.....100	

ENDORSEMENTS

W6TS.....210	W2MYV.....152	W0TKX.....130
W6VE.....191	W3ALB.....151	SM5DZ.....130
W5EGK.....191	G6RC.....150	W4CKB.....123
KV4AA.....190	W2ADP.....150	G6BS.....120
W8WZ.....190	W1TX.....150	VE3SR.....120
HB9X.....185	V5FR.....142	VE3BBR.....111
M3AB.....168	PY2NX.....140	W2VTH.....111
W6LDD.....160	W9RQM.....132	W8ATH.....113
	VP7NM.....131	

RADIOTELEPHONE

W3BES.....180	LU8CW.....150	ON4PJ.....130
W3GHD.....151	HB9J.....143	V5FR.....119
W9RNX.....150	W5FCF.....142	W5HFQ.....116



It is impossible to consolidate information on the basis of intangible factors. Many of the factors which make or break the efficiency of any particular AREC organization are strictly of an intangible nature. The attitude of the AREC gang, the degree of good relations with local officials, the popularity of the EC and his leadership qualities—all these are factors most important to the success of any local emergency or civil defense communications organization. They can be described on paper and even evaluated to some extent, but they cannot be consolidated into an over-all summary or survey of amateur emergency facilities, for a look at the general state of our preparedness.

A good many of the reports we receive here at Headquarters from ECs and SECs are of this nature. They do not deal in figures or quantities, but rather in evaluations of results and qualities. They do not tell us how many AREC members they have, how many mobiles, how much equipment; instead, they tell us what has been accomplished and how, and dwell on the good and bad aspects of activity, and discuss plans for the future.

The tangible figures which can be consolidated and surveyed into an over-all prospective are *less* important, perhaps, than the vital imponderables mentioned above; but this does not mean that they are *not* important. Throughout the years, reports of various kinds have flown thick and fast from appointee to leadership appointee to elected official to Headquarters. These reports have been filed, collated, tabulated, surveyed and, in time, discarded after they have served their purpose. They have enabled us to arrive at certain numerical facts which have been invaluable in presenting a numerical picture where such a picture is needed—and it often is.

The reporting system for the Amateur Radio Emergency Corps is simple, and can include both the numerical tangible factors and the intangibles. Unfortunately, only the former can be summarized and forwarded, except in a vague sort of way. The local EC, who keeps a record of local AREC members with information on each as to address, occupation, telephone number, equipment, hours of availability, etc., files a small card once a month with his SEC. If his organization is in good order, it takes him perhaps five minutes to

fill out this card. Once a month the SEC files a slightly longer report in which he summarizes the figures in report from ECs and passes along any other information which he considers important or vital; this requires perhaps a half hour to an hour of his time each month. The SEC report goes through the SCM and to Headquarters, where it is filed after being studied.

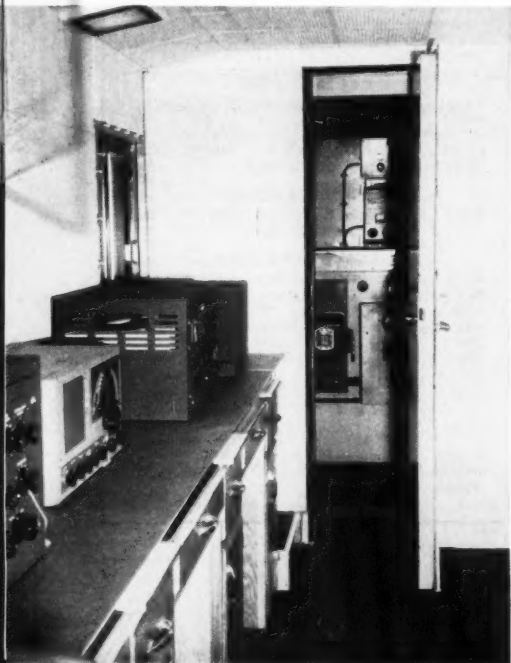
We have been studying these SEC reports to determine how effective they are as a means of evaluating the status of the AREC at any particular time—and how effective they *could* be. Our SEC report files, which go back to about 1946, show that at one time or another reports have been received from SECs of 39 different sections. This leaves 33 sections whose SECs have not sent in a Form 8 report since the war. Of the 39 who have reported, 16 last reported in some year prior to 1952 (one in '46, one in '47, two in '48, four in '49, eight in '50). The remaining 23 sections all have one or more SEC reports to their credit for 1951. The high month in 1951 was January, when 16 SEC reports were received; the low were July and November, each with six. Ten have been received so far for December. SECs in only three sections sent in reports every month in 1951—Colorado, Arkansas and Tennessee.

We by no means judge the value of an SEC (or ECs either, for that matter) on the number of reports he sends in. Nevertheless, considering the job we have to do and the importance of maintaining a close-knit organization so that the Headquarters can adequately represent the whole of AREC from a solid basis, we think that a high of sixteen reports from 72 SECs is not too good a showing. ECs may requisition Form 5 and SECs Form 8 from Headquarters upon request. A few minutes spent each month in filling them out is all that is required.

This column each month will follow the progress of SEC reports received and briefly summarize the statistics taken from them. We hope that your increased attention to this small but important detail will enable us to report continuing progress.

Amateur radio was the only communications out of Pierre, South Dakota, when sleet and snow completely isolated the city and surrounding area from December 6th until December 9th. At the first warning of the storm, W0UVL put the South Dakota Amateur Emergency Net into operation. During the emergency, this net handled train information, dispatched telephone crews, called doctors, relayed weather reports between CAA stations, sent news dispatches and handled many personal "worry" messages. During part of the time, band conditions deteriorated to the extent that messages had to be relayed, with W9OOL and W0UUD taking major roles in this work. Amateurs all over the country helped to keep this 3900-ke. frequency clear of QRM. W0s BTK, FKE, OXC and UVL were active in Pierre. Additional participants included W0s ARU, BGB, BJV, BLZ, BQH, BQS, BWP, CJS, CTI, DGC, DSK, DXC, DYM, EHO, EXX, FJS, GDE, GLA, GQH, GWH, HWM, HWS, HYV, IEL, IYN, IZA, JXJ, KTI, KZL, NMQ, MZJ, NJQ, OLR, OQQ, ORE, OVS, PHR, PRZ, QHX, QLK, SDE, SIF, UCX, UTD, VQC, ZNM, ZWM and ZUX.

Within 15 minutes after the plane crashed in Elizabeth, New Jersey, on December 16th, three amateur operators were on the air, one of them a mobile at the scene of the accident. W2HIN, who lives near the scene of the crash, served as control station while W2FMG mobile went directly to the scene to provide immediate communication. W2VQR, New Jersey SEC, joined them on 3995 ke. Messages were relayed to the Deputy State C. D. Director, State Police Headquarters in Trenton and to the Governor. W2ASG and



Philadelphia's civil defense "ace in the hole" is a 28-foot truck containing its own heating, lighting and air-conditioning facilities, and radio equipment capable of operating on police, fire, CAA and amateur frequencies. It also has outside floodlights and a p.a. system, telephone facilities which can be connected to any existing circuits, and a 10,000-watt a.c. generator. It was built by RCA for the City.

The amateur transmitters and receivers in the unit are shown above. The controls for the generating unit can be seen through the doorway.

QST for

W2SBP were standing by in Haddonfield in the event the Governor needed their services.

A little later, W2EUI/mobile joined W2FMG at the scene of the crash. W2LIQ and W2CQD operated from Red Cross Headquarters. W2GJQ/mobile served as a relay station. The 2-meter net was controlled by W2WCC. Others who participated were W2s CCY HVK HFP NKD YJC and WNs AZG and KNL.

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On September 21st W7FU advised W7HDN that the services of the Oregon Emergency Net were needed by the State Fire Defense Board. The forest fire situation in Tillamook County was out of hand, the phone lines into Tillamook were out and other methods of communication were needed. At 1430 W7HDN contacted W7LZE and W7HWX who got word to W7FKA to get on the air. The County Fire Marshall was at W7FKA and Captain Newman of the State Fire Defense Board was contacted by phone from W7HDN. W7HDN later moved his equipment to Oregon City, but was unable to get on the air in time to be of service.

The Oregon Emergency Net on 3840 is called upon frequently by Oregon state fire fighters, and the above is only another incident of several in which OEN has been of service.

TRAFFIC TOPICS

Expressions of appreciation for traffic handled on behalf of servicemen and veterans are beginning to reach us here at Headquarters. Some of these come from amateurs, some from non-amateurs who have benefited from the service. Here are a few of them:

1) The Coral Isle Amateur Radio Club, KG6AAY, wishes to express its gratitude to the many Stateside amateurs who have handled traffic from KG6AAY.

2) The Trustee of KG6FAA, now returned to the states, compliments the ARRL National Traffic System on its excellent service. Clem, KG6AAD (now W4MXC), mentions specifically W1MIQ, W2EC, W3CUL, W4KM, W4LXE, W4PL, W5DAD, W5EB, W5KRZ, W5KTL, W5MN, W6KYV, W6LL, W6WAE, W7IOQ, W7MZE, W8ARU, W9RUC, K0FAN, W0FFB, W0KVD, W0QXO, W0TRD, W0VXV and W0WEE. There are many others.

3) The Oregonian Amateur Radio Society of Portland, Oregon, installed two-meter transmitters in two Veterans' Hospitals in the vicinity in December, for the purpose of originating traffic which was relayed to W7WJ on two meters, sent to the speedy traffic nets. About 360 messages were originated from the two hospitals in three hours' time. W7WJ put the traffic on the regular NTS nets, for the most part; his main outlets were W6CE, W7FRU, W7HDN, W7NH, W7TH, W8SG, W6KHQ and W6ZJO.

4) W4HWA has been happily complimented for handling some traffic for the veterans of the U. S. Naval Hospital in Jacksonville, Florida. The traffic was routed over the Early Bird Transcontinental Net. Most of it, being Christmas greetings and utilizing the ARL texts, was speedily handled as a result.

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The call of W9NZZ has been appearing in the BPL right along without anybody thinking very much of it, especially since the totals submitted were not particularly high. This month, for the first time, he breaks into the "hard way" BPL list with a total of 507.

So what? We thought you might be interested to know that practically all of those messages came from people "frozen in" in the Far North with no other form of communication available to them for months on end, and that most of the messages were 300 to 500 words in length. Ordinarily, we discourage messages with texts this long, but we have to admit that in this case it's different, and that maybe W9NZZ's call in the BPL ought to have a gold star after it.

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National Traffic System. There has been quite a turnover of managements on NTS in the last few months. Nine NTS regional and area nets have been thus affected since the start of the present traffic season. Some of these have been covered in previous issues of this column, but we want at this time to introduce some new manager personnel.

In the Third Regional Net, W3GEG bows out in favor of his more pressing official duties with ARRL, and Bill Wiand, W3BIP, steps into his shoes. In the Sixth Regional Net, W6ELQ takes over temporarily from W6JZ, but Ed wants a rest from traffic and would like to see

someone else take the reins of RN6. In the Tenth Regional Net, W0SCA is turning the managership over to W0ITQ. In the Pacific Area Net, W0ZJO has resigned, leaving this net temporarily without a manager.

This turnover of managers is all right if there is someone to step into the vacuum. Otherwise, it is disruptive to the smooth operation of the system. When a net manager resigns, we always try to obtain from him a recommendation for his successor; and indeed, resigning managers should make sure the administration of the net is in capable hands before they step out — because quite often it is not possible to act quickly enough to obtain a replacement to avoid a certain amount of floundering on the part of an important link of the NTS chain.

December reports:

Net	Ses- sions	Traffic	High	Low	Av.	Most Consistent
EAN	24	1066	107	4	44.4	1RN, 2RN
PAN	24	1128	179	19	47	
1RN	42*	431	43	0	12.7	E. Mass.
2RN	68	585	42	0	9	NYS
3RN	42	165	23	0	4	W. Pa.
4RN	38	669	47	0	17.7	S. C.
5RN	48	1081	60	3	22.5	Ala., Okla.
RN6	60	1340			22.3	L. A., San D., E. Bay
RN7 (Nov.)	52	212	12	0	4	Idaho
RN7	54	598	62	0	11	Idaho
8RN	40	206	16	0	5	Ohio
9RN	27	557			21	Ind.
TEN	53	1261				
TRN	42	87	10	0	4.8	Ont.
QLN (Ind.)	68	1246	73	0	18	
TLCN (La.)	20	346	52	1	17.3	

* 34 sessions reported.

Eastern Area Net: W8SCW issues regular EAN bulletins. All NCS are supplied with reporting cards and NCS traffic record sheets. EAN is well attended by all Eastern Regional Nets, and a high level of efficiency is being maintained.

Pacific Area Net: The "one man Area Net" has lost its one man with the resignation of W0ZJO. PAN is temporarily without a manager.

First Regional Net: Certificates have been issued to W1EPS LYQ KRG NUP OHT and TBS.

Second Regional Net: Certificates have been issued to W2s CUI EAS GP RG and TYC. The 1830 session continued to increase in popularity while the 2130 session decreased; consequently, the 2130 session has been discontinued.

Third Regional Net: W3GEG, in turning over 3RN to W3BIP, expresses regret at his inability to do the paper work for 3RN. Sixteen 3RN certificates have been issued, of which those to W3s QZC WTS and UF have not previously been mentioned.

Fourth Regional Net: 4RN has liaison connections with all phone nets in the region, and c.w. nets in Virginia, North Carolina and Florida. Participation in EAN has been difficult due to QRM from foreign commercial station.

Fifth Regional Net: W5MRK is already thinking about RN5 summer schedule. It's not too early.

Sixth Regional Net: W6ELQ takes over temporarily until a permanent manager can be found.

Seventh Regional Net: W7NH reports that participation is on the increase, with Wyoming now on the "reliable" list, and some participation by British Columbia. Still nothing from Alberta, Saskatchewan or Alaska.

Eighth Regional Net: 8RN is holding sessions on Saturdays temporarily. West Virginia is now well represented through the efforts of W8s AUJ BWK and BTV.

Ninth Regional Net: Christmas traffic not as heavy as expected. Conditions have been very bad.

Tenth Regional Net: W0SCA says that NTS is a training ground for managers as well as traffic men. He will continue to support TEN, but W0ITQ is the pilot beginning February 1st.

Thirteenth Regional Net: VE1HT has earned a TRN certificate. He and VE1OM are keeping Maritime represented. A great bunch of fellows to work with, says VE3BUR.

SUPPLEMENT TO NET DIRECTORY

The following list of nets will supplement and correct the listings of page 65, January QST, and page 64, November QST. An asterisk (*) indicates correction from previous QST listing. This includes all information received between November 15 and January 17, 1952. Nets meeting less than once per week are not included. This list can be used to correct the mimeographed cross-indexed net directory. Another supplementary list will appear in May QST.

Name of Net	Freq.	Time	Days
Ala. Emerg. Net (AENB)*	3680	1900 CST	Daily
Broward Emerg. Net (Fla.)*	7140	0900 EST	Mon., Wed., Fri.
Caravan Club Emerg. Net (Texas)	29,400 3855	0815 EST 0100 CST	Sun.
Chittenden Co. Emerg. Net (Vt.)	29,568	1900 EST	Mon.
CAA Midwest Net CAA Net	3960 3967.5 3967.5 7263	0800 CST 1845 EST 0830 EST 1330 EST	Sat. Wed. Sat. Sun.
Clackamas Co. Emerg. Net (Ore.)	29,620	2000 PST	Wed.
Delta 75 Phone Net	3905	0730 CST	Sun.
Denver Amateur Radio Net	29,360 29,640	1930 MST	Wed.
DuPage Co. Civil Emerg. Net (Ill.)	29,600	1802 CST	Mon.
East Bay Section Net (Calif.)	3635	1900 PST	Mon.-Fri.
Eastern Mich. Novice Net (QEMN)	3730	1900 EST	Mon.-Fri.
Eastern No. Dak. 160 Net	1980	2000 CST	Mon., Wed., Fri.
Elkhart Co. CD Net (Ind.)	29,620	2100 CST	Wed., Fri.
Five O'Clock Net (B.C.)*	3797	1700 PST	Daily
Fla. Emerg. Phone Net*	3910	1815 EST	Tue.
Ft. Worth 10 Meter Emerg. Net (Texas)	29,640	1930 CST	Tue.
Houston Emerg. Net	29,100	2000 CST	Wed.
Hudson River Net (N.Y.)	144,900 145,645	2100 EST	Tue.
Ind. CW Net (QIN)*	3656	1600 CST 1830 CST 2200 CST	Mon.-Fri. Mon.-Sat. Mon.-Sat.
Iowa 160 Meter Net	1983	1900 CST	Daily
Ky. Blue Grass Net	3945	2000 CST	Daily
Ky. Korn Krackers Net	3945	0700 CST	Mon.-Sat.
Knights of the Kilocycles	3910	0700 EST	Sun.
Michigan Emerg. Net (MEN)	3930	0900 EST	Sun.
Minn. State Phone Net*	3960	1205 CST	Daily
Missionary Amateur Net (MAN)	3525 7050	1915 CST 1915 CST	Tue., Thu. Fri.
Mo. Emerg. Phone Net	3900	1830 CST	Mon., Wed., Fri.
Monmouth Co. Emerg. Net (N.J.)	147,150	2100 EST	Mon.
Monterey Bay Radio Club Emerg. Net (Calif.)	28,900	2030 PST	Mon.
Mt. Diablo Emerg. Net (Calif.)	29,600	2100 PST	Mon.
Nassau Co. AREC Net (N.Y.)	29,560	2000 EST	Thu.
N.M. 75 Meter Emerg. Phone Net*	3838	0730 MST 1800 MST	Sun. Tue., Thu.
N. Dak. 75 Net	3810	1900 CST	Mon., Wed., Fri.

N. Dak. 80 Net	3670	1930 CST	Mon., Wed., Fri.
N. Tex. Emerg. Liaison Net	3960	0700 CST	Sun.
N. Tex. Emerg. CW Net (NTS)	3760	0800 CST	Sun.
N. Tex. Emerg. Net (NTEN)	3930	0800 CST	Sun.
Northeast Tex. Emerg. Net (NETEN)	3940	0800 CST	Sun.
Northern Emerg. Net (N.Y.)	3510	1300 EST	Sun.
Okla. Traffic Net (OZL)	3682.5	1930 CST	Mon.-Sat.
Ore. Emerg. Net (OEN)	29,200	1900 PST	Daily
Otsego Co. Net (OTSCO) (N.Y.)	3570	1900 EST	Mon., Wed., Fri.
Ottawa 6 Meter Emerg. Net*	50,400	2100 EST	Tue.
Overseas Net	3955	0800 EST	Mon.-Fri.
Oxford Co. Net (Me.)	28,500	0745 EST	Daily
Quincy Emerg. Net (Mass.)	146,800	1030 EST	Sun.
Rubber City Net (Ohio)	3625	1900 EST	Mon.
Sacramento Valley Net (Calif.)	28,800	1900 PST	Mon.-Fri.
Sea Gull Net (Me.)	3961	1730 EST	Mon.-Fri.
Second Regional Net (2 RN)	3690	1830 EST	Mon.-Fri.
S. Dak. CW Net (SD)*	3615	1900 CST	Mon., Wed., Fri.
S. Dak. 160 Meter Phone Net	1905	2000 CST	Mon., Wed., Fri.
S. Texas Emerg. Net (CW)	3783	2030 CST	Mon.
Southern Alaska Emerg. Net	3892	2100 PST	Daily
Sunrise Net (N.Y.)	3950	1000 EST	Sun.
Tenn. Phone Net	3980	0800 CST	Tue., Thu.
Transcontinental Phone Net*	3970	1830 EST	Daily
(W1 Area)		1830 EST	
(W2 Area)		1900 EST	
(W3 Area)		2000 EST	
(W8 Area)		2030 EST	
(W9 Area)		2000 CST	
Transcontinental Relay Net*	7042	0115 EST	Daily
Upper Peninsula Emerg. Net (UPN) (Mich.)	3930	1000 EST	Sun.
Utah State Net (UT)	3700	2000 MST	Mon.
Val-Area Net (Calif.)	29,112	2000 PST	Mon.
Vermont Net (VTN)*	3520	1900 EST	Mon.-Fri.
Western N. Dak. 160 Net	1920	2000 CST	Mon., Wed., Fri.
YLRN Net	3900	0900 EST	Wed.
Zone 5 Civil Defense Net (Ohio)	29,160	2200 EST	Sun.

RESULTS — 1951 VE/W CONTEST

Final results have been announced by the Montreal Amateur Radio Club for the 1951 VE/W Contest. Listed below are the scores of all participants submitting entries. In each case the first-listed station has been declared a section winner and will receive a special certificate award from MARC. Figures following calls show the total score, number of sections worked and power input (A for 30 watts or less, B for 100 watts or less and C for input over 100 watts).

In addition to the section awards, special trophies are being awarded to the top Canadian scorer and the leading U. S. entrant. The VE award goes to Clifford F. Sawyer, VE5QZ, who will retain possession of it for one year, fol-

lowing which it will be presented to the 1952 winner. The W trophy goes to Carl Evans, WIBFT, a three-time winner. MAREC has voted to give Carl permanent possession of the award for his outstanding performance and will set up a new U. S. trophy for the next VE/W Contest.

Ten high scorers in the U. S. and Canada were as follows: VE5QZ 29,620, VE3BBR 25,233, VE2NI 23,016, VE3AGN 20,816, VE3BNF 16,320, VE3XY 12,954, VE1IM 12,128, VE1EK 12,096, VE2DR 11,408, VE3BTE 10,540, WIBFT 24,576, W8AJW 15,744, W2WC 13,776, W9GWK 12,960, W2HTH 10,752, W8YGR 10,416, W8FGR 9856, W1ODW 9216, W4LVV 9072, W2EQS 8000.

Maritime		Kentucky	
VE1IM	12,128-33-B	K4WBG	2576-7-C
VE1EK	12,096-36-B		
VE1MK	9546-43-C	W8AJW	15,744-8-B
VO6BV	9480-40-C	W8YGR	10,416-7-B
VE1XU	5304-26-B	W8FGR	9856-7-A
VE1FO	4329-26-B	W8PM	4032-7-B
VO1W/VE1	300-10-C	W8DAE	3936-6-C
		W8GND	3136-7-A
VE2NI	23,016-42-A	W8FRD	2880-4-A
VE2DR	11,408-31-A	W8GQD	1792-3-A
VE2KZ	6720-32-C		
VE2BK	5220-29-A	W2HTH	10,752-7-A
VE2BK	2162-23-C	W2NCG	1968-4-B
VE2CK	2160-27-C	W2BTB	1792-7-C
VE2SD	1407-14-B	W2HEI	432-3-C
VE2CI	720-15-C		
VE2WA	2-1-C	W2WC	13,776-7-A
		W2ETT	4452-7-B
VE3BBR	24,233-45-B	W2AIS	4216-6-B
VE3AGX	20,916-42-B	W2BVN	3360-7-B
VE3BNF	16,320-34-A	W2PZE	2496-4-B
VE3XY	12,954-34-B		
VE3BTE	10,540-31-A	W2EQS	8000-5-A
VE3ACB	7564-31-A	W2VJN	6720-6-A
VE3IJ	4620-33-C	W2ELK	6144-6-A
VE3BSW	4300-25-A	W2N1Y	1224-7-B
VE3BL	1530-17-B	W2MPP	880-5-C
VE4HS	1827-21-B	W1ODW	9216-8-B
		W1LHE	6720-5-A
VE5QZ	29,620-49-B	W1RST	48-1-
VE5EH	4313-25-B		
		W1GKJ	3040-5-C
VE6KX	3930-30-C		
		W1MX	2520-7-B
VE7YR	2640-22-B		
VE8WN	953-18-C		
		W1QGU	4440-5-B
W3EPA	5040-6-B		
		W1AOP	1872-6-B
W3DKT	6804-7-B		
W3QKO	5432-7-C		
W3JYH	4536-7-C		
W3PDX	2016-7-C		
W3JO	32--		
W2RFF	1008-3-B		
		W6NHA	648-3-B
W2KEL	5600-7-C		
W2WZQ	2880-5-A		
W2GRH	2160-3-B		
W3LXE	2120-5-B		
W3KUN	2816-4-C		
W3DKL	864-3-A		
W9HVP	2184-7-C		
W9MRC	960-4-B		
W9NJS	7479-7-B		
W9SFR	2112-6-C		
W9GWK	12,960-8-B		
W9KZZ	6720-7-B		
W9RKP	1248-6-C		
W9FXA	640-4-C		
W5KC	3168-6-C		
W4SON	6080-5-A		

BRIEF

WN9PVH and WN9QTH claim to hold the record for the longest Novice QSO, 3 hours and 21 minutes. Any Novices care to challenge their claim?

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for December traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	472	4760	4202	521	9955
K1WAR	2639	698	601	97	4035
W6KYV	252	1873	411	1452	3988
W6CE	60	1865	1816	8	3749
KG6FAA	965	311	453	783	2512
W7CZY	5	1202	1147	77	2431
W9JUT	42	1207	1097	9	2355
W4PL	14	1085	973	97	2169
W6ZJO	37	968	839	113	1957
J42KW	845	526	56	465	1892
W7IOQ	45	990	750	44	1829
W5PTV	92	632	596	12	1332
W1CRW	37	621	593	17	1268
W6GYH	24	572	436	136	1168
W5MN	5	68	506	577	1156
W8DAW	11	520	476	44	1051
K7FAG	335	354	11	334	1034
W5GZK	26	500	487	10	1023
W8RJC	25	500	431	67	1023
W6BPT	374	317	298	18	1007
K6WAE	16	439	432	8	895
W4PJU	7	439	398	41	885
W2COU	50	437	333	47	867
W6QXO	10	431	389	37	867
W2RUF	135	384	268	59	846
W5RIQ	508	168	145	10	831
W7WJ	11	415	375	5	809
W8SCA	4	403	392	7	806
W2VJN	28	380	214	172	794
KG6AAV	91	362	295	36	784
W3UF	60	326	324	56	766
W7GCT	0	371	369	2	742
W9ESJ	41	364	200	82	687
W5MRK	12	339	320	0	671
W4AGC	12	324	320	0	656
W9TT	37	313	234	69	653
W7BA	76	285	150	131	642
W4ANK	17	314	268	35	634
KL7AIZ	68	239	292	15	614
W9MQV	12	292	291	1	596
W8ITQ	12	291	164	127	594
W7HDN	64	265	150	109	588
W2BO	25	278	251	27	581
W9IXA	9	286	247	39	581
W4OGG	23	279	246	29	577
W7APF	37	268	249	14	568
W6CMN	29	268	161	107	565
W2OBU	325	94	76	18	513
W6GER	29	242	170	72	513
W6LDR	11	249	128	121	509
W8AUJ	16	261	219	12	508
W9NZZ	150	179	175	3	507
W4MGT	12	235	227	28	502

Late Reports

KG6FAA (Sept.)	1117	2181	1341	590	5429
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The following made the BPL for 199 or more originations-plus-deliveries:

W7IE	371	W6JZ	131	W2JHQ	103
K1WBG	282	W5QOD	129	W6CFL	103
W6BHG	158	W2PHO	125	W6LZG	101
W8ARO	133	W0DGA	123		
W2OE	148	W4HWA	118		
W6KFF	140	W5PAK	112		
W9JBQ	132	W3LQV	105		

A message total of 500 or more or 100 or more originations-plus-deliveries will put you in line for a place in the BPL. The Brass Pounders League is open to all operators who qualify for this monthly listing.

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, John H. duBois, W3BXE—SEC: ISE, RMs: AXA, BIP. On Dec. 27th a complete civil defense mobile unit, the first of its kind, was delivered to the City of Philadelphia, at Reynburn Plaza, by RCA. Notables in attendance were His Honor, the Mayor, superintendents of police, fire, and electrical bureaus, officers of the four branches of the military, CAP, Bell Telephone, ARRL, and civil defense administration. Also, in connection with AREC, the Pottstown Amateur Radio Association is expanding its present well-equipped emergency set-up and recently applied for an ARRL charter. Again we make a plea for ECs, particularly in the northern counties. AXA is new RM, handling E. Pa. Net. BIP now is checking into Third Regional Net. CUL's traffic total certainly is noteworthy. LQV also made BPL ASW and ADE had average errors of 1.3 and 6.3 p.p.m., respectively, in the November FMT! BES hit 240 in DXCC and needs only 2 states on 28 Mc. for 4-band WAS. CPV is moving to new QTH. Members of the York Road Radio Club going into the armed services will leave their dues and ARRL membership paid by the Club. A fine gesture. The Lehigh Univ. Radio Club, now using AEQ, will be on shortly with an MARS call. Semi-monthly meetings include code and theory classes. The Third Annual PVRC FRC joint meeting was held Jan. 6th at 2601 Parkway, Philadelphia. Successful as usual, the main items of interest were visits to HRD, BES, and 2SA, contests and their planning, and talks by outstanding DX operators from several countries. The number of reports from ORS is fair, but from other appointees is nil. Reports, not rumors, will help expand this column. Traffic: W3CUL 9955, BIP 342, AD 188, LQV 182, QEW 65, ADE 55, OML 26, HA 20, BXE 5, QV 2, BES 1.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—James W. John, W3OMN—Thirty-seven stations operating on 75 meters organized a Maryland Emergency Phone Net. Additional information can be obtained from KAV or TT. The Baltimore Amateur Radio Communications Society, on January 7th had a demonstration of pie-connection couplers. An auction followed the regular meeting. On December 17th "The Construction and Use of the Antenna Scope" was discussed. Regular meetings are held the 1st and 3rd Mondays of each month at the Red Cross Building, 23rd and St. Paul Sts., Baltimore. Members of the Rock Creek Amateur Radio Association braved the season's worst snow storm to have a social for their December meeting. The Chesapeake Amateur Radio Club now is three years old. An average attendance of fifty members per meeting, as well as many successful activities, are evidence of the effective work of this club. Phil Catona, 23AV, covered "Two-Meter Teletype" at the January 1st meeting. At the December 18th meeting John Markwalter of Bendix-Friez spoke on "Design of a Coaxial Wave-meter." A Baltimore County civil defense central station for organized fixed and mobile 2- and 10-meter stations was installed at 201 West Chesapeake Ave., Towson, Md. This station operates under the call AFM 3 on 29.6 Mc. Emergency power, Collins 32V-3 and 75A-2, and other equipment were provided by Baltimore County civil defense. Paul Magee, 3AED, Ocean City, Md., and Ed Hudson, 3BAK, Laurel, Del., again are active on 3.5 Mc. Jim Easley, formerly 5KRG, now is operating on 3.5 and 7 Mc. with the call 3SSG. CVE reports that TCRN, which meets on 7042 kc. at 0615 GMT, is going strong. W3SPL now is W3SPL in Delaware. Appointments made during December were MCD as ORS; QZC as OBS and OO, Class IV. Appointments renewed were IL, FQZ, JZY, and LZM as OBS; JZY as OPS. PLP recently moved to new QTH and has new jr. operator, born Jan. 10th, 4 traffic (Dec.) W3UF 766, CVE 182, QZC 146, JZY 139, ARB 113, FWP 90, LZM 81, MCD 30, NNX 27, BWT 20, CQS 16, JHW 16, NOE 8, IL 7, COK 2, (Nov.) W3GVE 110.

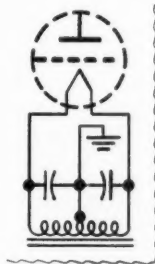
SOUTHERN NEW JERSEY—SCM, Lloyd L. Gainey, W2UCV—The SJRA held its post-Christmas Party and election of officers on Thursday, Dec. 27th. The large

turnout included many YLs and XYLs, who seemed to enjoy the professional entertainment provided at great expense by the club. SPV was elected president; JAV, vice-president; ZIA, treasurer; EGP, recording secretary; and WUP, corresponding secretary. Directors are PFQ, JRO, KHW, ZDG, PTM, FXT, and YPQ. FXT reports a very interesting vacation trip through Florida over the holidays. OQN worked feverishly to put a 2-meter station on the air for the V.H.F. Contest. PDV visited the SJRA Christmas Party while on leave from the Army. Your SCM would like to remind all club secretaries that the mailing deadline is the 7th of each month. Consequently, I would appreciate receiving any information for the column before that date. The antenna at the QTH of K2BG came down, but he kept on his schedules with his feeders frozen in ice in the back yard. The Delaware-Lehigh Amateur Radio Club Civil Defense Net meets Sundays at 8 a.m. on 2840 kc. LTI is running 240 watts to a single 8005 driven by a pre-war Meissner Signal Shifter. BDI has joined the Teletype Net on a temporary basis. Traffic: W2RG 220, ZVW 186, K2BG 134, W2LTI 43, ASG 39, ZI 10.

WESTERN NEW YORK—SCM, Edward G. Graf, W2SJY—SEC: UTH, RM: RUF, NYS Net is on 3915 kc. at 7 p.m. NYSB on 3625 kc. at 8 p.m. Congratulations to RUF on winning the Golden Rule Award given by the Tell Your Neighbor program on the Mutual Broadcasting System. The RM wishes to thank all for the splendid co-operation during the holiday traffic schedule. NYSB net call on 3509.5 kc. is YCD. At the joint meeting of RARA and RDX for Old Timers Nite, more than 100 persons in attendance and antique gear was on display. DOD, BLO, and VIQ have jr. operators. YUT has new 813 rig going FB. DJF has A-1 Operator certificate. To win a bet RGA got on the air from new QTH by feeding the XYL's kitchen cabinet. Pay up, YPW. ICE, the antique collector, fell and hurt his ankle working on a new antenna. SAW has a new 75A-2. ALL and YTE have new 6BQ7 converters for 144 Mc. QY has a new Viking I. UPH has had his rotator repaired and is DXing again. FFU visited UXP. ELX assembled an Eldico kit for 144 Mc. The Niagara Radio Club Christmas Party was well attended and a good time was had by all. At a RAWNY meeting OXC spoke on antennas and feed line matching. HQV is heard regularly from Barker and reports in to the NYSB Net. DAA is on 10-meter mobile. Lockport Novices heard are KKK, KLL, GLG, ALR, and ELS. KBT sponsored its famous Monte Carlo Game Nite. COU received 35-w.p.m. Code Proficiency endorsement and has a new 40-meter half-wave vertical antenna on the air. QHH made DXCC on 28 Mc. with QRP rig. KEL is out of the Navy and back on the air. An amateur radio club is being organized in the Corning Area. Contact UMJ for details. FE is active in all ARRL Frequency Measuring Tests. QNA lost his sixteen-element beam in a storm and now will be on with one having less wind resistance. GSS has been appointed Zone 8 Coordinator by the NYS c.d. office. TQ changed QTH and is back on the air from new antenna farm. More stations are needed in the NYS c.d. nets to give better coverage. Sun. 9 a.m. 3970 and 3509.5 kc., Mon., Wed., and Fri. on 3980 kc. at 6:30 p.m. and 3509.5 kc. at 7:30 p.m. CCA and W2CJA received RCC certificate. KIC and PYC donated a receiver and transmitter to Herkimer Co. c.d. director. CPN is working 7-Mc. DX. DJF received Advanced Class ticket. PGT is active in TLAP, COU, OE, and RUF made BPL. Appointments: PGT as ORS and OPS. Endorsements: COU, RUF, and RUT as ORS. FE and QQ as OO. QNA, RXW, and UYG as OPS. RUF as RM, ICE, KEL, and UYG as OBS. Traffic: (Dec.) W2COU 867, RUF 846, FCG 302, OE 266, DJF 217, SJV 54, RUT 50, PGT 17, VIQ 17, QHH 7, EMW 4, (Nov.) W2CPN 25, PGC 11.

PENNSYLVANIA—SCM, Ernest J. Hinsky, W3KWL—Our sincerest thanks to each of you who has helped to make 1951 one of the most successful years the Western Pennsylvania section has ever enjoyed. With the closing of the old year the section boasted of its 24 ECs, 3 OBS, 4 OOs, 21 ECs, 2 RMs, 1 PAM, and numerous amateur radio clubs. From up the Great Lakes way, QN sends in the following: QMY signed down to 7 Mc. now and then. OIH is rebuilding his mobile. DKL is moving his shack to another part of the house. PLX is giving 7 Mc. a try. OIE has a clamp-tube going. KKK is using new receiver on mobile. NNU now is working as 9CAN in Colorado. SER will be on 28 Mc. with an 813. TFX was a visitor with Old QPP over the holidays. NXK reports that the 75-meter Lake Erie Emergency Net attendance has fallen off. KNQ reports into the W. Pa. Net now and then. Around the Horse Shoe Bend Country: WPA of the *Hamateur News* of Altoona sent in his club paper. Heard handling traffic on 14 Mc. is Bob Nedimyer, now JATRV. QPF enlisted in the armed services. If you hear the call 3CA, it's

(Continued on page 72)



LISTENING to the Novice stations on our bands is apt to bring back to us "old timers" fond memories of the "good old daze" when we were just starting in the game of ham radio. These memories are bound to produce a pronounced feeling of tolerance and good will toward the beginners of today. Does a ham, no matter how many years at the game, ever forget his first QSO? Do you remember some of the amusing mistakes you made when you were still green as grass? Certain things still stand out in the writer's mind. I was first licensed in July 1924. The first transmitter used a UV-202 on 180 meters. The antenna system was the inevitable antenna and counterpoise, the latter being the lower half of the antenna hung a few feet above ground. The antenna current was 1.2 H. W. amperes!

The power supply was similar to those used today except for the rectifier. Efficient tube rectifiers were not available yet so a "slop-jar" rectifier was used. This consisted of a couple of dozen jelly jars with slabs of lead and aluminum for electrodes. The electrolyte was a solution of borax in water. I plainly remember the day that the family cat started to quench its thirst from one of the jars just as I pressed the key!

All DX was worked at night as daylight DX was not possible. I remember visiting a ham in Attleboro and watching him work a W4 right in broad daylight, using a de-based UV-203 on 40 meters. It was just unbelievable! The usual procedure to work DX was about as follows: after supper the rectifier jars were filled with new borax solution and the power turned on until the plates were formed. The power was turned off, the alarm set for 3:00 A.M. and then to bed. At 3:00 A.M. the rig was turned on and checked. Ah! The H. W. ammeter reads 1.2 amperes. Now to work the DX (maybe a W9 or a W5) until the sun comes up. As the first faint signs of daylight showed in the east, the DX would fade out. About now the antenna current was down to .2 amperes and a look at the rectifier jars showed that the borax solution had boiled away until it barely covered the bottom of the plates.

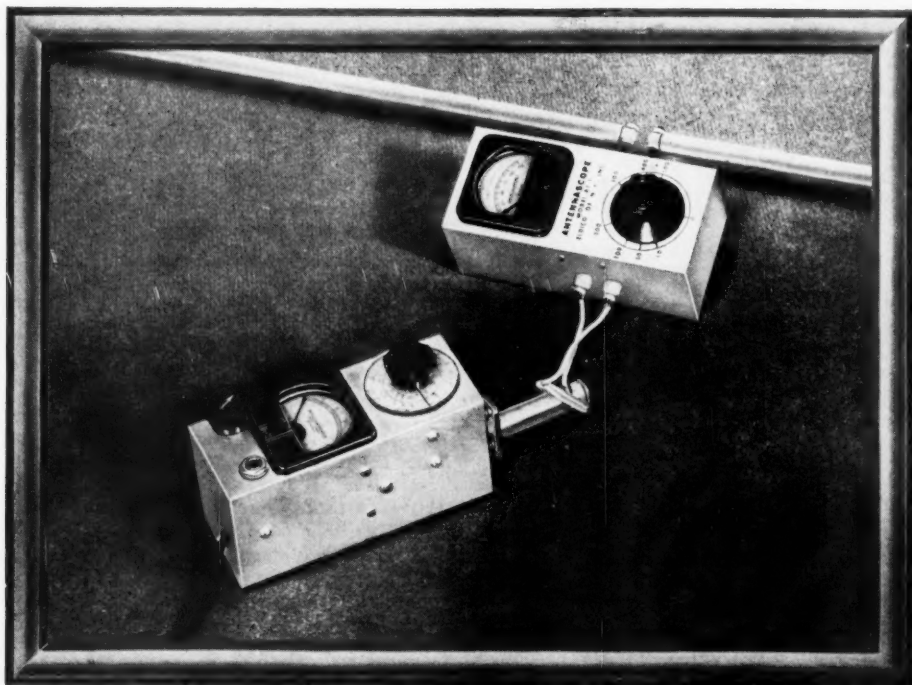
As an example of what green-horns can do until they learn better, let me relate an embarrassing little episode of my own. In those days we made our own equipment, but, of course, it was much simpler than today's apparatus. In building the transmitter I needed two capacitors. I obtained several 6" x 4" x 1/4" glass plates from the local photographer, stacked them with copper foil plates and taped up the bundle. And where did I use them in the circuit? As filament center-tap bypasses as shown in the sketch. With these two huge capacitors in series across 7 1/2 volts A.C., I was not bothered with voltage breakdowns.

I often feel that to-day's ham who buys a transmitter and receiver ready-made and perhaps has someone else put up his antenna for him is missing a great deal of the fun in ham radio. I mean the pleasure and thrill of building up a piece of gear and making it work. What an advantage he has over the old timer, too. I have just been looking over the new 1952 National parts catalogue. There is an array of parts such as the old timer never dreamed of. All kinds of tuning capacitors capable of handling any power or frequency that the amateur is allowed to use. There are all kinds of choke coils, sockets, couplings and other "small stuff." Tank coils are available (we used to wind them on oatmeal boxes) and even complete tuning systems like the MB-40L and MB-150. All types of dials are available from the little MCN to the fancy PW drives. And so on. What the old timers wouldn't have given to have had all that available back then. After all, the good old days are nice to dream about, but today's ham certainly has the advantages.

CAL HADLOCK, W1CTW



ELDICO ENDORSES FCC PLANS



Eldico's Engineering staff led the fight for the correct approach to TVI elimination. Early realizing that Amateur Radio was being blamed for defects in TV receiver design, Eldico produced the now famous "W2GX" High-Pass filter. Results of many actual field tests and installation of these filters in TV receivers procured enough data so that Eldico has convinced certain TV manufacturers to install the Eldico High-Pass filter in cases of complaint which call for use of a high-pass filter.

(PICTURED ABOVE)

GRID DIPPER

Indispensable in eliminating TVI. Based on the original grid-dip oscillator designed by W2AEF and improved with regeneration especially for locating and analyzing harmonic energy. The grid-dipper includes special case, tubes, internal power supply and big 3" meter. Range: 3Mc-250Mc. in six steps.

GDO, complete kit with assembly and operation instr. \$29.50
Wired and tested. \$43.00

ANTENNASCOPE

Indispensable companion for the GDO, used for positive antenna performance and efficiency resulting in less TVI. Measures radiation resistance, resonant freq., transmission line impedance, receiver input impedance, feed line standing wave ratio, etc. Each kit complete including 100 μ a Meter.

ANTENNASCOPE—complete with instructions \$24.95
Wired and tested. \$29.95

This filter is available separately to set owners—it is a must for the FCC Plan for handling TVI.

Eldico endorses the FCC Plan and manufactures the tools to carry it out. See your Dealer and start YOUR TVI Plan now.

Every station returning to the air becomes a valuable national asset. Do your part and stay on the air with ELDICO.

(PICTURED ON OPPOSITE PAGE)

LOW-PASS FILTER

ELDICO's now famous TVD-62 is a two section M-derived low-pass filter supplied with coaxial connectors for the input and output. Attenuation of harmonics radiated by the antenna is in excess of 60db. The TVD-62 will handle up to 1 kw. A.M. and is designed for 52 or 72 ohm coaxial feedlines.

TVD-62: Complete with instr., \$9.99
TVD-62: Wired and tested \$12.99

HARMONIC CHASER

A must for TVI. Modified absorption type wave meter for locating, measuring and identifying transmitter harmonics. Will not swamp from fundamental. Requires an external current indicator as listed below:

TVH—complete kit with instr. less meter. \$6.98
TVH—wired and tested. Less meter \$10.98
TVH500—500 μ a Meter in matching case. \$7.50

HIGH-PASS FILTER

ELDICO's famous, compact, high-pass filter for reducing and eliminating r.f. from the TV receiver. Quickly and easily assembled in minutes. Install directly at antenna coil of TV Receiver.

Size: 2 3/4" x 1 3/4" x 1"
TVR-300: 300 ohm Filter. \$1.98
TVR-62: coaxial 52-77 ohm \$1.98
Either filter wired, tested. \$3.98

BRUTE FORCE LINE FILTER

R.f. feeding back through the power lines is a serious source of TVI and BCL. Patterned after the recommended model in the ARRL Handbook, the brute force line filter kit comes in 2 models—1 kw.; and 2.5 kw. The TVL-1KW supplied with heavy duty line cord and plug and female a.c. outlet receptacle. The TVL-2.5KW is equipped with BX clamps for securing a.c. lines.

TVL-1KW: Max. line drain of 1 kw. Complete kit with instr. \$7.98
Wired and tested. \$10.98
TVL-2.5KW: Max. line drain of 2.5 kw., \$13.98, V.W. and T. \$19.98

Signal of Distinction

Have you heard our "Private Tutor" Novice Course? See your distributor or our ad in QST, November, pages 70-71.

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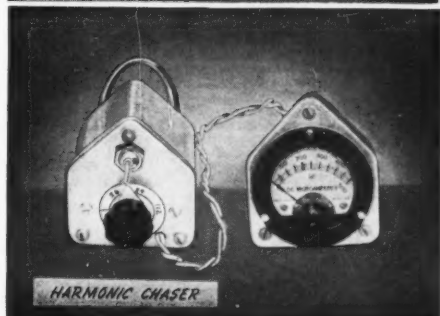
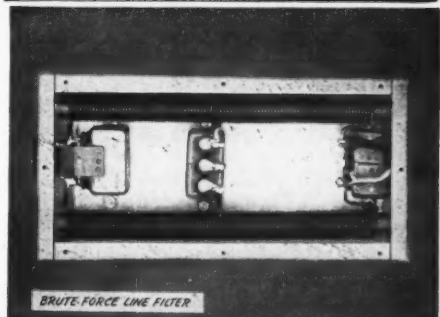
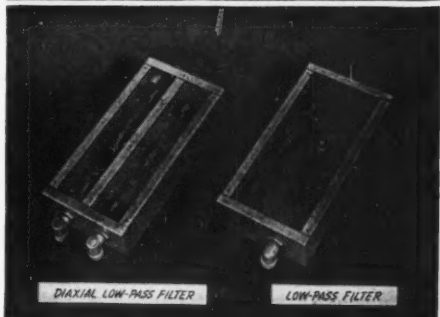
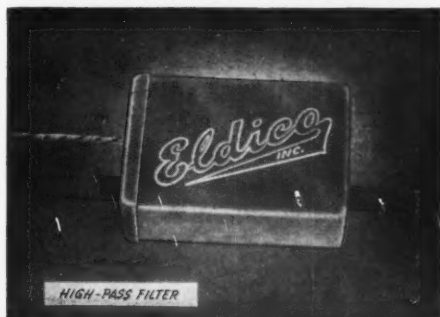
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ELDICO'S AT ALL LEADING DEALERS

the other half of OFO. CA will be used as home station and OFO at his summer cottage. QFO says activity down Greensburg way is dropping off. LEJ is working at WDAD. MIZ does a nice job, along with KUN, for the WPA Net. UHN puts in a nice signal with his dipole antenna, fed with co-ax. KVR keeps a constant sked with KAUSA handling overseas traffic. AER, we believe, is the first in the Pittsburgh Area to take advantage of the FCC ruling to obtain the Advanced Class amateur ticket. ODU scored 46,000 points in the SS. LEV says his home-built Monitone works FB. CA has been appointed Radio Representative on Communications Division of Civil Defense of Westmoreland County. The Steel City Radio Club paper reports that the club station, KWH, took part in c.d. as Net Control. Others taking part were UHM, EXT, and NKM. The big job for LKA is to finish his 1-kw. final. NKM worked 100 contacts on 75-meter 'phone with 60 watts in the last SS. Thanks to the boys who put out the *Kilo Watt Harmonic*. Your SCM, along with Director GEG, his XYL, and SOAJ had the pleasure of attending an informal dinner held at the YMCA. NUG supervised the affair. After the dinner we attended the ATA meeting at the Buhl Planetarium. NUG conducted the club meeting. UL did a nice job helping the Novices on questions and answers, and AER gave a talk on his new super receiver. JSH is getting an automatic dish washer so that KWA can find more time to get back into amateur radio. We saw pictures of the c.d. bus the boys from the South Hills and Brass Foundries have rigged up for their part in civil defense. LMM, as EC, is going all out to put Pittsburgh back in the c.d. ranks. Traffic: (Dec.) W3JSH 250, KYR 189, G1Y 168, AAX 77, NUG 72, NCD 66, KWL 54, MIZ 53, KUN 29, UHN 16, LEV 12, AER 10, CA 6, NKM 3, MOT 2, ODU 1. (Nov.) W3MIZ 24, MOT 5.

CENTRAL DIVISION

ILLINOIS—SCM, H. F. Lund, W9KQL—SEC: QLZ. RM: BUK, PAM: UQT. IEN, 3940 kc. ILN, 3515 kc. SRRG officers for 1952: NOO, pres.; VOK, vice-pres.; QLZ, secy.-treas. CIRC, at Bloomington, will have SXL, pres.; ZSF, vice-pres.; and CFV, secy.-treas. during 1952. DOR uses new TV set for de-TVing his rig. SKR was active in the SS. LRA is building for 2 meters with an eye toward RTTY soon. MRT has a new Viking. PRV is spending his air time on 160 meters. The first Novice in Bloomington is WN9OUF. MBI and ZHB completed first year of two-way operation on 435 Mc. OES and OPS appointments are available; drop me a line and application blanks will be sent promptly. DUA has reactivated OBS skeds. AOV is active on ILN. BPV, EQC, KQX and MAL saw the new year in with a round table on 144 Mc. WN9PRN has a nice signal but it keeps him busy replacing filter condensers. ERH rebuilt and is back on 144 Mc. Red is hunting DX. 6FNE, chief operator at KPFAE, now has an XYL; one of his former code students at Scott AFB. Congratulations! CRD, MO, 4CVO/9, HPG, and QBJ were active in the November FMT. CRD's readings were within 3.5 p.p.m. average. My mail service here is slow so please get your reports in the mail not later than the 2nd of each month; the deadline for this copy is the 7th. Five mobiles worked from 2:30 to 5 p.m. in the scheduled home test Nov. 10th at Evergreen Park. Two mobiles and one fixed station assisted in the Chicago test Nov. 20th. Be sure to send your comments and suggestions to AND, Central Division Director, right away for the annual ARRL Board Meeting. ICF is new EC at Waterloo. FGZ is signing DL4HM from Germany. Art has a BC-610 coupled to a 12 wavelength-per-leg "V" beam set upon the highest peak in Western Germany; the beam is headed for Chicago. LMC got Nevada to complete his 10-meter WAS. SKR is shielding buccer stales to reduce TVI. CEE is new ORS. Traffic: (Dec.) W9SXL 201, YIX 182, OR 168, CSW 142, KQL 128, UQT 120, BUK 98, IAY 19, YTV 15, DOR 12, CTZ 9, LMG 8, BPU 6, LRA 6, NN 6, SKR 6. (Nov.) W9KRI 34, OR 26, DOR 8, BPU 6, DUA 6.

INDIANA—SCM, Clifford C. McGuyer, W9DGA—DKS is building new exciter. New officers of the DARC are JJJ, pres.; OMD, vice-pres.; WN9OFW treas.; W0C1W/9 secy.; and FYC act. mgr. VNV operates the MARS Nets. DJH operates 144 Mc. BKJ has Novice Class license. QKS moved to Maryland. DKS is chairman of Fort Wayne's Mobile Net. NZZ keeps a schedule with VESML and VESMA twice daily. They are located at Albert and Eureka and are frozen in for months, with only amateur radio for communications. LSX has a new transmitter. RDW is experimenting with carrier current. TT received Public Service award from ARRL for work in the Missouri-Kansas Flood. JLN, UDO, EPI, EQZ, JOQ, and NTJ gave the Lion's Club an amateur radio demonstration at Fort Wayne. IFN now covers 41 cities. UNT has new 10-meter beam and grid-dip oscillator. TT is directing the Novice RFN Net. AZJ has a TV set. BKJ will have a party for IFN charter members. DLI is on 144 Mc. GZB has new 40-foot antenna. EBN is on 75-meter 'phone. EUJ is back on after a lapse of several years. CGM is on 75-meter mobile. KVE has a pair of new 805 modulator tubes. New officers of the Indianapolis Radio Club are ATS, pres.; KCP, vice-pres.; D. Miller, secy.; and C. Pence, treas. Total QIN traffic for December was a new

high, 1246. New OPS appointees are IFR and LZL. The Martinsville Club has nine licensed amateurs. New Novices are PPS, PAS, and QAV. KRJ is new Lake County EC. New Class 100 is LZL. QLW is rebuilding. MAM is new communications manager for MARC. JBQ reports c.w. RFN traffic total was 36. MJU is new editor of *TARN Sparks*. Zelon Audritsch, of the Indiana State Police, has been appointed Director, Communications Division, Indiana Department of Civil Defense, and is counting on the amateurs for emergency communications. Traffic: (Dec.) W9JUL 2355, TT 653, NZZ 507, TG 343, JTX 298, JBQ 295, DGA 185, QLW 135, NZW 133, DOK 96, BKJ 86, DJH 70, LIZ 55, KDV 28, BDP 25, PMT 25, FZW 24, CWH 18, CWH 17, IFR 16, CGM 8, RCGM 6, GZB 6, NH 2 (Nov.) W0DHH 76, YNV 11, NH 6, DKS 3, WISCONSIN—SCM, Reno W. Goetsch, W9RQM—PAM: ESJ, RMs: CBE and IQW. C.w. net (WIN) 3625 kc., 7 p.m. daily; slow-speed at 6:30 p.m. 'Phone net (BEN) 3950 kc., 6 p.m. daily. Net certificates (BEN) were issued to IDW, LIK, GDW, HDV, NPT, and ZHZ. BEN roll-call now has a total of 121 stations. LSX is adding a Montone for break-in operation. New calls in Spooner are PTU, W9QEU, and W9QEX. PTU is mobile on 28 Mc., while AOW's mobile is on 4-Mc. 'phone. ELY's rebuilding is way behind schedule. NLE received his last-class commercial ticket. RUF reports that the MAREC operates IJT, the EC station, and UMX, 9, at the C. G. Control Room. Wausau was very successful in the 10-Mc. W5S Party by KKK with 118 contacts in 26 states; JQP, 100 in 25; VWX, 76 in 24; DPN, 8 in 6. A new modulator at OOD will put him on 10- and 160-meter 'phone. NVK replaced his superreg with a VHF-152 converter for 144 Mc. DIB and TQ are working each other on 144-Mc. telegraph IVE and IHW took part in the November FMT. NRP resumes activity at new QTH, Fort Atkinson. FFE reports hearing JBF and LEE at Ft. Sheridan on 144 Mc. QSL Mgr. CFT has migrated to 3.5 Mc. and frequently can be found on WIN. As of this writing, the first of the call-letter automobile license plates have been delivered. Because of pressure of work and lack of time, UFX has relinquished his duties as SEC. New mobiles soon to be heard are LVB and JEV. Congrats to IXA, MIQV, and ESJ, who made BPL this month. Mark your calendar now for the annual Hamfest of the MVR at Wausau, April 26. EWM has a new Viking I transmitter. QZC is a new call at Wausau. IZE says the YL makes heavy inroads on his available time for radio! OLO was host to the Wolf River Radio Club in January. ELZ has returned to Antigo after a year with the Navy. LJI is new OPS. IVE renewed OPS appointment and qualified as OO Class I. Traffic: W9ESJ 687, MQV 596, IXA 581, CBE 268, IQW 125, DR 56, SFL 54, LSK 49, IJH 47, FXA 45, KZZ 36, ANM 27, AOW 27, FWD 21, ZGL 20, ELY 17, OVO 13, NRP 9, IHW 7, RQM 6, NLE 5.

DAKOTA DIVISION

NORTH DAKOTA—SCM, Everett E. Hill, W0VKP—Latest information on North Dakota nets is: 'Phone net at 1830 Mon. through Sat.; c.w. net at 1830 Mon., Wed., Fri. FGX is in Alaska with the Air Corps. HAI also is in the Air Corps. MEK is active on 50 Mc. and would like all 50-Mc. enthusiasts to contact him. YEQ and DM are conducting Novice classes at the local high school and have given exams to seven prospects. BKB has a new shack and rig set up with activities on 28 Mc. HSM, from Warren, now is in Grand Forks. DM is beating his head against the wall with the bugs in his new final. VLC, RPT, and YJC are active from Grand Forks. The NDAC Radio Club reports BZJ, pres.; and AJH, vice-pres. The Club conducts code classes twice weekly at the College. RRW, TDI, BZJ, UGM, and VKP assisted in a ham radio demonstration for the Fargo Engineer's Club, with RRW giving a speech and conducting the demonstration. Traffic: W0LHS 42, FPW 37, KZL 22, DM 16, UGM 12.

SOUTH DAKOTA—SCM, J. W. Sikorski, W0RRN—The South Dakota C.W. Net now meets at 7 p.m. CST Mon., Wed., and Fri. on 3815 kc. Ex-BJH, now 4TOB, has been discharged from the Air Force and has purchased a home in Sioux Falls. He and the XYL, 4TMC, are shopping for a transmitter. JT new BLZAHW Fairbanks. New calls: GFS, Columbia; W9FOD, Rapid City; and EUJ, Viborg. DTB has a new Lyco 600, and IZA has a Viking. The Prairie Dog Arco, Vermillion, conducted a "traffic-fest" and handled more than 60 messages. CXM, Pierre, has 500-watt under construction. STY again is located at Huron. CQI now is VFO and is adding another 1625 to his 17-Mc. net. BLZ, proprietor of Olsen's antenna farm, had the legs of 5 "V" beams come down in ice and wind storm. EHO, South Dakota NCS of MARS, needs outlets. Get MARS applications from RRN. Traffic: W0UUL 299, CQI 167, OLB 112, PHR 82, EHO 49, RRN 34, HWS 30, BQS 19, FJS 14, WUC 14, ZWL 7, MDN, ESJ, T, SCM, Charles M. 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WNØEBA is a new ham at Northfield. The mobile gang at Minneapolis has a ground plane antenna at the control station that is 280 feet high. GGQ has a new 15-watt transmitter. CXO and 9ZHK/Ø are new calls in Bemidji. ITQ is the new Tenth Regional Net Manager. There now are 72 stations checking into the Minnesota Phone Net. There has been 1420 applications made for the new State call-letter license plates. BCT was the first one in the Twin Cities to receive the new Extra Class license. AMM and AME attended the ARA Club meeting at Duluth. VE3AHD, 8VUW, and ØRXL paid a visit to the Mesabi Wireless Club. The ARA Christmas Party was a big success due to the help of JCL and JVD. Duluth has an emergency net on 29.660 kc. at 8:00 p.m. on Tuesdays. QIG is mobilizing in Florida for the winter. WEH is back on the air with a 32V-2. MXC raised his 75-meter wire another 20 feet. LIL had a modulation transformer go west. CWB also is having transformer trouble. MLT is temporarily off the air because of school studies. EPJ is building a kw. with 810s. QYZ now is a grandpa. ZWM has been heard on 75 meters. YPN has been giving c.w. a whirl. The South Western Minnie Radio Club banquet was a big success. The Minneapolis Radio Club, Inc. also had a Christmas banquet that was very successful. MRX is back on 75 meters. KAI soon will be on 75 meters. AJK is looking for a place to hang his 160-meter antenna. QIQ has a new Gonset Tri-Band and Mastermount. BMJ is going on 144 Mc. BGJ is building for 2 meters. Traffic: W6ITQ 594, KFF 478, MXC 173, HEO 119, BRA 74, UCV 66, GYH 52, EA 48, LSC 36, TKX 30, SWN 27, BPI 22, PEV 22, RXL 22, EPJ 18, FIT 18, FTJ 5, FJJ 3, EVD 2, PXB 2.

DELTA DIVISION

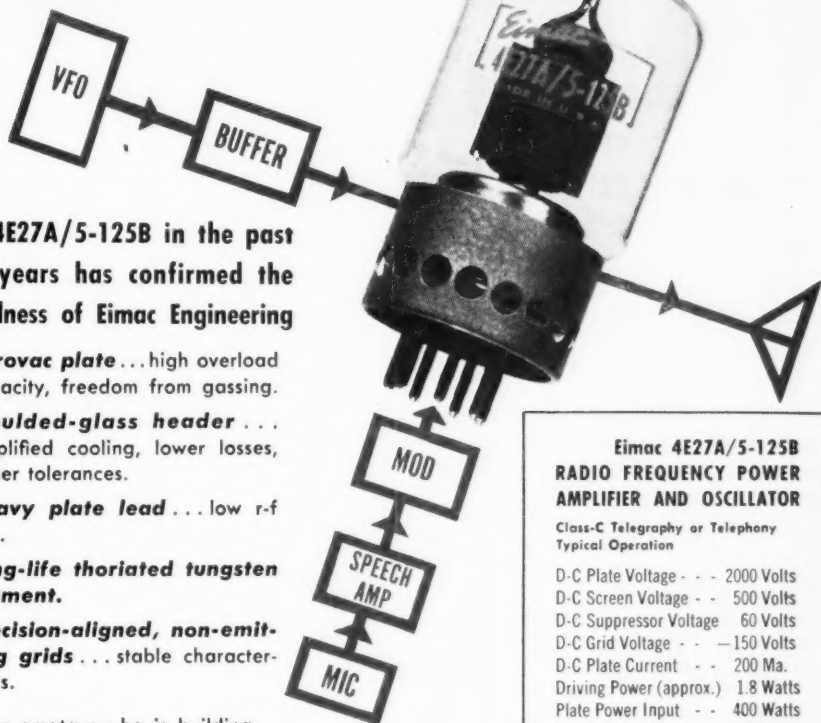
ARKANSAS—SCM, Dr. John L. Stockton, W5DRW —LUX had the yearly ice storm and handled the traffic for Harrison through OEF and ICS. Nice going, fellows. RWJ has been busy working the traffic nets, as has FME. LUX is working on rig to get on all MARS frequencies. ANR has been QRL with his taking an old job again at Camp Chaffee. NKH made some nice frequency checks — also LUX and EA. UEB and UBZ are on the air at Fayetteville. Conway hams entertained the Little Rock gang at a weiner roast which was well-attended and enjoyed by all. PCN has new 10-meter beam. Some reports reach me too late to be included. They must be in my possession by the third, so try to mail them not later than the first of each month. Reports are welcome from all amateurs, so let's hear from some of you new Novices. Traffic: W5RWJ 207, FME 90, ANR 12.

LOUISIANA—SCM, Robert E. Barr, W5GHE —LET has moved to Pineville. TCQ operates 5 and 7 Mc. from Mansfield and is building new 150-watt job. LCA, ex-98QZ, of Donaldsonville, now is an operator at K3WAG. Army Chemical Center, Md. STA and THL, father and son, of New Orleans, are hunting some slow-speed net practice. The CAP Net now meets on the state frequency of 3870 kc. each Tuesday evening. USN reports serious difficulty copying the WIAW bulletins direct because of skip conditions. EM and FMO are making some FB records in the Frequency Measuring Tests. RIQ is a regular member of the Post Exchange Net on 14 Mc., RN5 and DON on 3.5 Mc. PL, traffic operator super-extra, visited NG recently. TUK, UDS, and TQX are newcomers in Shreveport. KRX and MWE are active on RN5. NG now has two boys and two girls. DMP needs a picture of about the best-looking beam layout ever, a three-element ten over a four-element twenty, on top of an 85-ft. tower. WN5TVW reports in from New Orleans. MWE is a consistent member of 7 different nets. Louisiana hams wish PQD, who is hospitalized in Covington, a rapid recovery. The attendance on the Pelican Net now runs better than 35 stations per week. 2GRY has applied for his WS call and has set up the fixed station 2GRY/5 in Springhill after being mobile for several months. BLQ and RTG both underwent surgery in December with successful results. OXF still keeps Ramey AFB traffic moving into Barksdale. IKB now is a consistent net outlet for Alexandria. Traffic: (Dec.) W5RIQ 831, NG 176, MWE 48, GHF 32. (Nov.) W5RIQ 367, NG 349, MWE 45, GHF 39.

MISSISSIPPI—SCM, Norman B. Feehan, W5JHS —LPL is the new SEC for the State. MUG, retiring SEC, has taken a position with the Telephone Co. RUT now is in Japan. Look for him on the air. PGF has been promoted to it. colonel. SEP is in Colorado learning all about guided missile. K5FEB is doing a fine job on traffic, thanks to Jim and Ruel. SSB and JHS are checking into CFN-LBY. SFC, RWN, and WM check into the Hurricane Net. WM has emergency power available at a minute's notice. SNR is back on 7 Mc. after a fling at 28 Mc. TRK has rebuilt his 75-meter rig. NYV is active on 75 and 10 meters. TUO has finished his 10-meter rig and is having lots of fun working W6s. RIM and RHC are doing a fine job taking Jackson traffic. Thanks to SMD and RMC for the FB job they are doing with the 10-meter net. Your SCM would like to have a post card or QSL from every Novice in the State. Traffic:

(Continued on page 76)

EIMAC LEADERSHIP PROVED AGAIN!



The 4E27A/5-125B in the past two years has confirmed the soundness of Eimac Engineering

- **Pyrovac plate**... high overload capacity, freedom from gassing.
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Class-C Telephony or Telephony
Typical Operation

D-C Plate Voltage	- - 2000 Volts
D-C Screen Voltage	- - 500 Volts
D-C Suppressor Voltage	60 Volts
D-C Grid Voltage	- - 150 Volts
D-C Plate Current	- - 200 Ma.
Driving Power (approx.)	1.8 Watts
Plate Power Input	- - 400 Watts
Plate Dissipation	- - 100 Watts
Plate Power Output	- - 300 Watts

applications. The 4E27A pentode is rated at 125 watts of plate dissipation, is capable of an easy half kilowatt input of class-C service, or when suppressor modulated will deliver 75 watts power output at carrier conditions.

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TENNESSEE — SCM, D. G. Stewart, W4AFI — GC has been appointed Route Manager, succeeding BAQ. Walt resigned to give more time to his AREC and other civil defense activities. All our thanks to you, Walt, for a fine job. Let's get behind Jim and keep the c.v. net rolling along. Tennessee boasts two in the BPL this month; one a newcomer, AGC, and the other our regular, PL, who followed U.T. to the Sugar Bowl. QT acquired a 32V-2 for use as a driver. FI is involved in model airplane radio control. PHQ reports success with Novice Class code sessions. PFP bought new Tri-Band and Mastermount antenna and is sporting a brand-new Advanced Class ticket. The Mid-South Amateur Radio Assn. has a new prexy in BAQ. Other officers are IIV, vice-pres.; FEB, secy.; JWO, treas.; DQH, DIX, HHK, IBG, LVW, and VT, directors. The following Memphis amateurs recently completed the Standard Red Cross Course: BAQ, FEB, GQQ, HHK, IBG and XYL, LRO, LVG, LVJ, LVS, LVW, NMM, RBL, and WNAUI. The Fountain City Radio Club has attained 100 per cent ARRL membership and is pushing 100 per cent AREC. AEE recently completed construction on 1-kw. alternator utilizing garden tractor for power. Many Eastern Tennessee hams are making progress on TVI reduction since Channel 2 has become so popular in this area. Traffic: W4PL 2169, AGC 656, CXY 419, IIB 108, RMJ 83, AEE 30, IHO 20, HHQ 21, LQE 20, BAQ 16, NJE 16, PFP 8, PMR 6, SZL 2.

GREAT LAKES DIVISION

KENTUCKY — SCM, I. W. Lyle, jr., W4KKG — K CDA adds another hobby to his list — minstrel man! WBG has a big traffic count for the month. QM, for Kentucky, says that the credit for an FB operating net on KYB should go to NCS and members. Anyway it's a pleasure to listen to their snappy roll call and operating procedure! WN4TYP is on the air in Columbia; likewise WN4TOY in Louisville. MWX, for KYN, and RFI, for KYB, had nets alerted for any traffic from the ice storm area in Western Kentucky. MGT, SEC, makes BPL with a fine total. JUI is improving his frequency measuring equipment. EII now is at Ft. Campbell. PRT has a new 32V-3 on order. TFK is new president of Bluegrass Amateur Radio Club, with MWR as vice-president. MEY does quite well in Frequency Measuring Tests. JXF has Viking rig going now. Joe is new president of the Amateur Radio Transmitting Society of Louisville, which is celebrating its 25th anniversary this year. RQV says work at Campbell has him missing the nets a lot. TAV is building a new VFO and working some 10-meter 'phone. NEP completes a new VFO. For some swell operating technique listen to NEP handle the job of NCS on KYN some night! RRF, in Frankfort, says he will be heard from if he can get a signal out of the "hole." KQI has a nice-sounding mobile rig. SZL is in the traffic game now and likes it. KKG has a new 32V-2. VP drives a pair of 4-125As with 310B. OYG gets the bug and leaves DX long enough to report in on KYB. Traffic: W4MGT 502, K4WBG 488, W4MWX 161, NEP 135, PRT 86, BAZ 85, NBY 81, MQ 38, KKG 33, BXU 20, CDA 18, TAV 10, SZL 4, RQV 3.

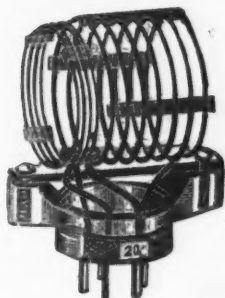
MICHIGAN — SCM, Norman C. MacPhail, W8DLZ — Asst. SCM (c.w.): J. R. Beljan, 8SCW, Asst. SCM ('phone): R. B. Cooper, 8AQA, SEC: GJH, RM: UKV, YKC, and ELW. PAM: UTH. New appointments: OBS to FWC, OBS to FZ, 2HIW, ex-8PHO, is in Murray Hill, N. J. AYV indicates he will be moving to W6-Land come spring. New officers of the Cherryland Radio Club are QPO, pres.; FFG, vice-pres.; ZWM, secy.; ZLK, treas. FX is building p.p. 24G final after completing his VFO/exciter for the present p.p. T40s. DAP's father was severely burned in a fire which destroyed his shop. EEF is temporarily QRT with his new receiver back at the factory for adjustments. TIC is rebuilding his big rig and is QRP with 35 watts on QMN. FLASH! UKV is fascinated with a modulator in a borrowed VFO! AGA caught Salsas (his XYL) sneaking down the chimney with a new HRO-50-1, and is he happy! IBB is working on a new VFO. NIT is in the market for a good second-hand 80-meter antenna — will trade some first-class 807 parasites for it. NQ reports no more TVI in his rebuilt rig. New officers of the Jackson Radio Club are FMG, pres.; WNSHKJ, vice-pres.; BBY, secy.; FVO, treas. ALL reports WNSHMA has a new harmonie in the family. New officers of the Allegan Area Radio Club are HJO, pres.; RJC, vice-pres.; FLA, secy.; COM, treas.; Ralph Goss, activities director. KBI has a Lyseo driving his new p.p. 813s. VLE is working ground wave on 28 Mc. with the gang across the lake. BQA attended the communications conference on civil defense in Washington, D. C., and reports c.d. will continue to play a big part in the lives of the amateurs. DTB threatens to go back to Houghton Lake with a rig that can be heard on the BRNet. FNH is reporting into BR when home on leave from Great Lakes. YKC is back on the air after letting his license expire. ENZ has been DXing on 3.5 Mc. ILP says MTH now is secretary of the Edison Radio Amateur Assn. The Hot Air Net continues to pull big crowds Saturdays at 1230. Traffic: (Dec.) W8DAW 1051, RJC 1023, ZLK 412.

(Continued on page 78)

the COIL that foils breakage

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Now Bud gives you improved performance, better appearance and long lasting quality in these 75 watt coils with the new Polystyrene base. Polystyrene has proven superior to porcelain for many reasons, including

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Bud 75 watt coils are furnished with fixed or adjustable center links and fixed or adjustable end links. They are air wound, mount into 5-prong tube sockets and can be used on bands from 6 meters to 160 meters. OEP and OCP Coils are designed for use in circuits using Pentode tubes with high output capacity such as 6L6, 807, etc.

Catalog No. Fixed End Link	Catalog No. Fixed Center Link	Catalog No. Adjustable Center Link	Catalog No. Adjustable End Link	Band	Capacity*	Amateur Net
.....	.....	OLS-160	.....	160 Meter	100 MMFD	\$2.28
.....	.....	.....	OES-160	160 Meter	86 MMFD	2.28
OEL-80	OCL-80	OLS-80	OES-80	80 Meter	75 MMFD	1.95
OEL-40	OCL-40	OLS-40	OES-40	40 Meter	52 MMFD	1.92
OEL-20	OCL-20	OLS-20	OES-20	20 Meter	40 MMFD	1.83
OEL-15	OCL-15	OLS-15	OES-15	15 Meter	30 MMFD	1.80
OEL-10	OCL-10	OLS-10	OES-10	10 Meter	25 MMFD	1.74
OEL-6	OCL-6	.....	.....	6 Meter	17 MMFD	1.41
.....	.....	OCP-10	OEP-10	10 Meter	45 MMFD	1.74
.....	.....	OCP-20	OEP-20	20 Meter	50 MMFD	1.83

* Denotes tube plus circuit plus tank plus output coupling capacity required to resonate coil at low frequency end of band.



• SHIELDED • COIL LINKS

These links are made to fit RLS, VLS, and MLS series of coils. This link will prevent capacity coupling between the tank coil and the link and would reduce TVI by greatly attenuating harmonics. The links can be used on co-ax or balanced lines.

Catalog Number	DESCRIPTION	Amateur Net
AM-1300	Used with RLS coils (150W)	\$1.92
AM-1301	Used with VLS coils (500W)	2.19
AM-1302	Used with MLS coils (Kilowatt)	2.61

Bud products include coils, condensers, R.F. chokes, sheet metal ware, etc. See the complete Bud line at your local distributors.



• ADD-A-LINKS

When the circuit that you are using requires a different number of turns on the coil link than is furnished with the standard coil, the links listed below can be used to replace the standard link.

Cat. No.	Used With	No. of Turns	Amateur Net
AM-1303	RLS	3 1/2	\$.52
AM-1304	RLS	4 1/2	.54
AM-1305	RLS	5 1/2	.63
AM-1307	VLS	3 1/2	.52
AM-1308	VLS	4 1/2	.54
AM-1309	VLS	5 1/2	.63
AM-1310	VLS	6 1/2	.72
AM-1311	MLS	3 1/2	.81
AM-1312	MLS	4 1/2	.96
AM-1313	MLS	5 1/2	1.05
AM-1314	MLS	6 1/2	1.14



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ELW 389, SCW 275, ILP 151, QBO 134, QIX 103, DLZ 87, IV 56, SPF 50, COW 45, FX 45, AQA 40, RTN 37, WAO 35, YNY 29, IKX 27, TZD 25, DAP 21, DOI 20, QPO 17, LR 16, JY 14, TQP 14, YKC 11, LLD 8, SWF 7, BID 4, ENZ 4, MGQ 4, ECI 3, (Nov.) W8UKV 140, NZZ 71, SWG 67, IBB 23, COW 21, NIT 19, KHT 10, DQL 4, EGI 2, FFG 1.

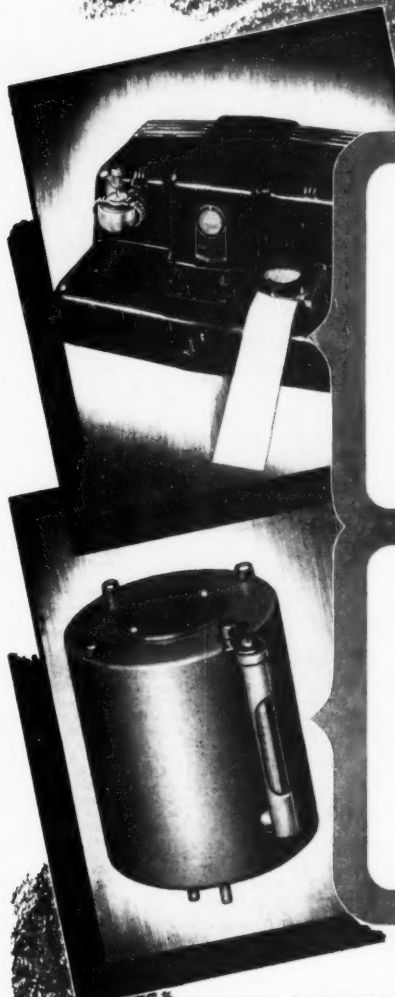
OHIO—SCM, John E. Siringir, WSAJW—Asst. SCMs, C. D. Hall, 8PUN, and J. C. Erickson, 8DAE, SEC: CPB, PAM, PUN, RMs: DAE and PMJ, ARO made BPPL, New ECs are RM for Ottawa County, for Noble County, and TOB for Lorain County. CDT has moved to Los Angeles. CAS is operating over CN8FB. AUP is threatening to go QRP. AQ received his 3.5-Mc. WAC endorsement. PBX has completed his new shack. WE has acquired a 10-acre antenna farm. DGG is in Florence, Italy, and hopes to be on with a 32V-2 and BC-610. LBH is active on 425 Mc. again. DMD worked his 201st country. PEN has returned to 3.8 Mc. Newly-elected WPRO officials are AJW, pros.; SBB, secy-treas.; and VM and ZEU, trustees. YCP was elected president of the Dayton Club. BRA has just received QSL from country No. 220. WNSHOM has worked 16 states with his ten watts. LJS, QSL Manager, was guest of honor at the last WPRO meeting. CTO suggests that more operators should monitor 3890 kc. during daylight hours. RO, ex-RJ, has returned to the air after an absence of 18 years. ASCTZ is NCS of the new Northeastern Ohio MARS Net, which meets Mondays and Wednesdays at 1900 and 2100 EST, respectively, on 27,994 kc. The OCARC met on Jan. 12th. ZIP operated from the mayor's office in Beaver Dam in the e.d. alert of Dec. 9th. UPB, our most capable and SEC, is doing a fine job of covering the section. LBH has acquired a Viking I kit. FJX is a newcomer to the 2-meter band. Only two bulletins arrived this month. The Q5 of Springfield tells us that WNSHRI is on 145 Mc. every evening. GUD has a brand-new male harmonic. WNSHOF is city commissioner at London, Ohio, and IRT is a newly-licensed amateur. The Columbus *Cavalcade* states that Col. Windom, GZ, was the speaker at the Jan. 4th meeting. KP4KO now is IHI at Lockbourne Air Base. FJN is back with the 37th as Div. Signal Officer. WRN has worked 19 states on 144 Mc., and Franklin County AREC, in charge of WAB, EC, met on Jan. 8th. Your new SCM wishes to thank the reporters in this section for the ever-growing support and operation he has gotten. As all of you know this is YOUR column and each additional report received will make it more "newsy." Bart Geib, W8WE, chief operator of the Ohio State Highway Patrol, Findlay, Ohio (and in the Patrol for some 15 years), writes to say that the Patrol is expanding operations from 400 uniformed men and 40 radio operators to 650 and 80 operators. Communicate with Col. Mingle, Supt. OSHP, or with W8WE, if between the ages of 21 and 35 and interested in the requirements for radiomen or patrolmen. Traffic: (Dec.) W8FYO 482, ARO 466, IB 294, DAE 223, EIU 157, UPR 93, DXO 42, QIE 39, AL 35, CTO 34, PUN 34, IZQ 32, AQ 20, AJW 16, EQN 14, YGR 14, ZAU 11, RO 9, WAB 7, ZIF 7, FJX 6, ET 4, (Nov.) W8FYO 435, SG 87, GAV 44, YCP 41, IZQ 21, AQ 4, BEW 2.

HUDSON DIVISION

EASTERN NEW YORK—SCM, Stephen J. Neason, W2LLI—This is my first report as your new SCM. As you know, the pressure of the requirements of CLL's vocation became such that it was necessary for him to abandon ham radio for a few months. All of us wish George the best of success, and we would like him to know that everything possible will be done to assure the continuation of all of his policies. We are happy to note that George is retaining the post of Assistant Director. Teamwork is the foundation on which the success of any section is built, and CLL has assured me that such teamwork need not be solicited as it has always been present and is one of the outstanding characteristics of this section. My field of activity has been mainly limited to 75- and 2-meter phone, and for the past year I have served as your SEC. I will rely almost entirely on the suggestions and activities of the Route Managers and the OPS for c.w. traffic field; likewise, the PAMs and the OPS for the phone nets, phone traffic and associated activity. Also, suggestions from any number of the section are solicited, welcome, and will receive prompt attention. AREC work is moving along splendidly, and that field also is expected to grow to meet the new demands. Jan. 5th marked PHO's 175th QNI into DON, *every single morning*, starting July 14th, including holidays, seven times a week! Most news items regarding section activities, traffic totals, and appointments made or renewed are omitted this month because of insufficient time to transfer the necessary records. This information will be included with next month's report. Please send me as much information each month as you possibly can, and don't forget that news and traffic reports must reach me by the fifth of the month. Thanks and 73 to each of you. Traffic: W2PHO 325.

NEW YORK CITY AND LONG ISLAND—SCM, George V. Cooke, Jr., W2OBU—SEC: SYW, RM: TUK, PAM: YBT. The new TVI Organization of N. Y. has the

(Continued on page 80)



SUPPLYING TODAY'S NEEDS

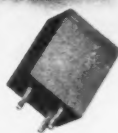
Present-day jeweler's "magic" is seen in this Time-O-Graff, used to check accuracy of watches. Made by the Borg Equipment Division of the George W. Borg Corp., it relies on the delicate mechanism of a JK H18-5 crystal.

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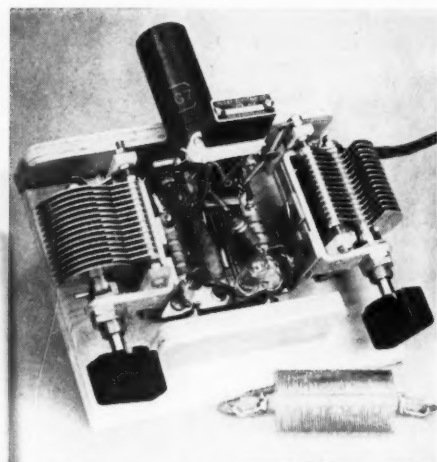
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May 1951
page 21



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following officers for '52: EBP, pres.; KTH, vice-pres.; DIC, secy.; KNV, treas. The group announces a 10-meter TVI Sweepstakes to get all possible 10-meter boys on the air from Mar. 1st to 15th to include all W2s in the entire call area. The best 7 nights out of the 15 with 1 point scored for each contact mailed to DIC will be the way to get in on this worthwhile way of ticking TVI. Prizes will be a hand-painted tie with the call letters and a beautiful certificate presented to those turning in the highest scores. The Sunrise Club elected the following officers for the new year: DIC, pres.; CIQ, secy.; LFY, treas.; AAG and EEG, delegates to FLIRC. The Club operates a net on 3950 kc. Sundays at 1900 for all members. The North Shore Radio Club officers are KSZ, pres.; JMA, vice-pres.; BT, treas.; AMB, secy. Some of the members are leaning to a.s.b. and trying out new beans. AMB is lining up QCWA members for a net on 3810 kc. Thursdays at 1900 and Sundays at 1100. The Mid-Island Club recently elected YBT, pres.; UCB, vice-pres.; QOW, secy.; SMQ, treas.; CLG and CWP, trustees to FLIRC. OXM was voted a life membership, the first ever in the Club. GE, past pres. of the Albany Radio Assn., was voted a new member. Look for Paul on 7-Mc. c.w. The New York Radio Club selected VOU, pres.; IXE, vice-pres.; ZPW, secy.; GKP, treas.; and OBB, hon. secy. for 1952. The Club has a membership of 117 and maintains and operates GTE, the Red Cross station at 315 Lexington Ave., N. Y. C., with all modern gear, 7 antennas, and 2 operating positions. The Nassau Club in East Rockaway picked IWE, pres.; VL, vice-pres.; WN2KFV, secy.; UXY, treas.; CB, K2AC, and TUK, trustees. The Club boasts a membership of 60 with 14 WNs on the roll. The code and theory classes conducted at the East Rockaway H. S. enrolled 35 people who completed the courses headed by IWE on theory, JZX giving code, and VL teaching advanced code. So far 12 students have secured licenses. The Club station is open to all visitors. The Levittown Club officers are HDB, pres.; SPR, vice-pres.; FWL, secy.; KCV, treas. and Club trustee. HXA, LDK, IEH, and GNB received their licenses through the Club's efforts. The Tu-Boro Club in Woodhaven picked JSV, pres.; PFY, vice-pres.; HYD, treas.; RJL, secy.; AVI and YSM, delegates to FLIRC. The Club runs 3 sittings per year to finance de luxe Field Days. BOT and AVI are active members of VWA. The Queens Radio Amateurs of Glendale elected LRI, pres.; AOD, vice-pres.; MJO, secy. The Club has 14 members with a couple of father-and-son combinations. Members participate in 420-Mc. endeavors and many are in the NLI Traffic Net. The Lake Success Club, YKQ, named BQM, pres.; MHE, vice-pres.; and TNI, secy. An intensive program of TVI elimination is in progress and participation in Field Day and V.H.F. SS Parties are the main interests. LRI received his ORS appointment. ENW has accepted OO Class IV appointment and HIV has earned his OBS certificate. VNJ, BO, JBG, and OBU received IPL certificates. BNX made 1001 contacts, including contests, on 144 Mc. alone in '51. Traffic: W2VNJ 794, BO 581, OBU 513, EC 320, JBG 214, LPJ 202, GP 201, OUX 128, TUK 105, VVP 87, OUT 60, MQB 54, BGO 31, DIC 28, PF 17, PZE 15, QOW 10, DZK 8, BNX 5, RQJ 5, DXN 2, EBY 2, IVX 2.

NORTHERN NEW JERSEY SCM, Thomas J. Rynn, jr., W2NKD—SEC: VQR. The Jersey Net meets at 1900 daily on 3700 kc. The C.D. 'Phone Net meets at 0630 Sundays on 3995 kc. The N. J. 'Phone Net meets at 0900 Sundays on 3900 kc. The Garden State ARA held its annual dinner Dec. 19th in Fairhaven. If you want to join the Club, contact LMB for details. Elizabeth Area hams did great work following the tragic C-46 plane crash which took 56 lives. Taking part were FMG, EUL, LIQ, CQD, GJQ, WCC, HVK, CCY, YJC, WN2AZG, WN2KNI, HFP, IIN, and PIX. Direct contact to c.d. headquarters went through VQR. The latter attended the FCDA meetings for a week in Washington. He reports great progress being made for amateur radio in the c.d. organization. AREC applications were received from HGD and ETH. WN2AJB is working 144 Mc. from Villanova College, where he seeks an E.E. degree. FQN moved to New Brunswick. IQP received her General Class ticket. A prolific letter from LDG reports terrific progress with c.d. in Irvington. Working with him are VBA, QLF, ZMH, HFP, IQP, WN2KDW, and IGX. QJY moved to Hillside. WN2BVS has new Technician Class ticket. In three months he has worked 30 states plus the VEs and Bermuda. An early bird, he operates from 0430 to 0630. Among the many who are active on the Transcontinental 'Phone Net are AOW, CCS, DXD, HTD, LMB, LTI, and K2USA representing our section. JKH made WAC by getting a JA on 14 Mc. HIA reports the Middlesex County Emergency Net is working on 147.12 Mc. on Fridays at 1930. NCY visited many W4s while attending the Armed Forces Industrial College in Louisville. In addition, he was a new Motorola receiver for his mobile. CCS was appointed chairman of radio communication in Westwood. EAS, using a.s.b. 'phone with 50 watt peaks, worked four W6s. NIY has worked 220 Novices. OXL bought a home in Westfield. The Ocean County ARA held its annual dinner Jan. 26th. LIQ is the new EC of Elizabeth. YKX has purchased a new WBL-150 watt and is active on 144 Mc. Traffic: (Dec.) W2LMB 344, CUI 337, CCS 314, WCL 202, CGG 167.

(Continued on page 82)

New 1952 HEATHKITS

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- New "spot shape" control for spot adjustment — to give really sharp focusing.
- A total of ten tubes including CR tube and five miniatures.
- Cascaded vertical amplifiers followed by phase splitter and balanced push-pull deflection amplifiers.
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ANG 113, EAS 105, OXL 26, NCY 20, NIY 14, HIA 10, CFB 8, CJX 4. (Nov.) W2CUI 218.

MIDWEST DIVISION

IOWA—SCM, William G. Davis, W0PP—AUL had a pleasant surprise birthday party from the members of the Des Moines Radio Club. NFL is in the Navy. ZFO is building a new compact 60-watt c.w. phone rig. YTU has new Lyco rig. PZO received his ORS appointment. New Novice licensee in Burlington is WN0CCG. ANR and TQG now have their Advanced Class licenses. LAC visited his son in West Virginia over the holidays. SCA again makes BPL. It's getting to be a habit. WMU reports that his son, IVA, was home on a 20-day leave from Korea. YTA reports that he's coming back on 75 meters one of these days, by heck! The Waterloo Club threw a dinner party for the XYLS at the December meeting. 90JZ and his XYL, WN9PCW, are new Waterloo residents. RFT is spending his time looking for a new TV set. The Iowa 160-meter Net's rolls list 37 members, of which 26 are ARRL members. BBZ reports from Iowa City. BWL reports a new VFO which is working top shape. PP now is a member of the Old Tilers Club. SEF is a new OBS. Watch for his bulletins on 3540 kc. at 9:45 p.m. Monday through Sunday. Let's see that this column is filled with news. Traffic: (Dec.) W8SCA 806, QVA 294, YTA 190, NYX 110, BBZ 64, DFD 42, PZO 28, WMU 12, USO 9, BWL 1. (Nov.) W0DDR 34.

KANSAS—SCM, Earl N. Johnston, W0ICV—SEC: PAH, RM: FDJ, PAM: HEC. The Jayhawk Amateur Radio Society of Kansas City held election of officers Dec. 20th and now has CAG, pres.; DXE, vice-pres.; ZGK secy-treas.; and FQE, Robert E. Kuhl, AHC, and KXL/NIY, directors. On Dec. 28th the Central Kansas Radio Club elected BGW, pres.; BDK, vice-pres.; PKD, secy-treas.; and TSR, act. mgr. On Dec. 15th CKRC held its annual ladies' night with forty members and XYLS attending. The Mo. Valley Emergency Net, which operates on 28.85 Mc., handled 62 messages during December. GHR is Net Manager. OAQ, also from Leavenworth, was very busy on TCN handling Christmas traffic. WN0ECT is a new call there also. EIC, at Larned, has just finished 500-watt rig with p.p., 813s and three-element beam on 28 Mc. LIX, besides keeping his OBS skeds and pinch-hitting for Ed, is building a 6-meter converter. UWN, of Waterville, a new reporter, has a new NC-125. DXS, of Topeka, got his General Class ticket after having his Novice ticket a couple of months. WN0DVT has 30-watt mobile rig on 144 Mc. and 2-meter Gonsert parking FB. OBO is getting his clamp-tube modulated 4-125 going on 28 Mc. The Kansas C.W. QKS gang handled over 800 messages. Nice going, fellows. Traffic: W0NIY 185, FDJ 149, OAQ 122, BET 105, WGM 96, YFE 85, BLI 69, ICV 25, LIX 24, KXL 21, TDW 14, BNU 12, VBQ 10, HBL 2.

MISSOURI—SCM, Clarence L. Arundale, W0GBJ—QXO makes BPL again although activities were curtailed because of the illness of his XYL. CFL gathered a nice traffic total from MON, TEN, CAN, and DON Nets. Our apologies to BVL for the error in the last traffic report. BVL's traffic was mainly from the Early Bird Net. IQY reports into MON, MEN, TEN, and TQPN Nets. ICW reports increased traffic activity on SE MO Net. WAP recently paid CKQ a visit. ARH is secretary of his city bowling association so ham radio has been neglected of late. GAR's traffic fell off because of his illness during a part of December. OUD reports a need for outlets in Southeast Missouri on MON Net. AJD is in Washington, D. C., attending C.R.E.I. and we miss those traffic reports from him. HUL has new Lyco VFO and is TVing the transmitter. EBE is building a new exciter unit which looks very fine. PIJ has the rig back on the air, but is having trouble with r.f. in the speech amplifier. GIW now has a DX total of 151 countries. The SMARC has elected the following officers for 1952: BPD, pres.; CIA, vice-pres.; CZC, secy.; YLL, treas.; and EBE, act. mgr. KIK is reporting to MON and TEN Nets. MRD visited his father, BPD, during the holidays. FNN is trying to eliminate an offending harmonic. December brought forth many good traffic reports. Those handling traffic are urged to send a monthly report to their SCM. More reports on news items of interest are needed from various parts of the State. Traffic: W0QXO 867, CFL 424, IQY 181, BVL 174, GBJ 165, CKQ 163, GAR 87, EBE 54, HUI 47, OUD 38, ICW 20, KIK 12, NNH 7.

NEBRASKA—SCM, Guy R. Bailey, W0KJP—JED has resigned as SEC because of the press of his personal business. JDJ, of Lincoln, is our new SEC. Fran is a member of the State Civil Defense Board. OYB is geologist on Cache Dam in South Dakota and reports the arrival of a new baby girl. QHK now is one of the operators at K4AF. Fort Myers, Va. AUS has moved to St. Paul, Minn. APK now is living in Denver, Colo. BFB is sporting new Advanced Class ticket. BUD is a newly-wed. IOS is the daddy of a new baby girl, Linda, born Nov. 12th. Frank is trying to get those 250hs working. SAI acts as N.C. for the c.w. net when Buzz is absent. Buzz reports new c.w. wet meter. AFB, YNA, GFI, WGB, BSA (in Colo.), and GEQ, UVU is doing a nice job with the 75-meter net. BZC now is active

(Continued on page 84)

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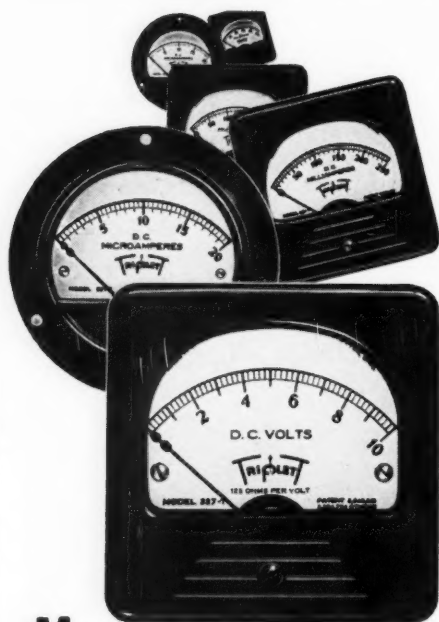
—TO BE CONTINUED

APTITUDE RATING No. 8236		APTITUDE RATING No. 8237		APTITUDE RATING No. 8238		APTITUDE RATING No. 8239		APTITUDE RATING No. 8241	
Frequency (Mc)	Attenuation per 100 ft	Frequency (Mc)	Attenuation per 100 ft	Frequency (Mc)	Attenuation per 100 ft	Frequency (Mc)	Attenuation per 100 ft	Frequency (Mc)	Attenuation per 100 ft
100.	2.65	100.	2.10	100.	1.90	100.	3.10	100.	3.75
200.	3.85	200.	3.30	200.	2.85	200.	4.40	200.	5.60
300.	4.80	300.	4.10	300.	3.60	300.	5.70	300.	7.10
400.	5.60	400.	4.50	400.	4.35	400.	6.70	400.	8.30



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on 75- and 160-meter 'phone and soon will be a member of the 75-meter net. BXJ reports having a fine time with OO duties, checking 3.5- and 7-Mc. c.w. and says 'phone operation is almost nil. HZE, USB, and UJL are the engineers at KWOU, the new h.c. station at Omaha University, on 550 kc. every Monday and Wednesday, 11 a.m. to 3 p.m. Your SCM wishes to thank all of you for your fine cooperation in getting your reports in the first of each month. Traffic: (Dec.) W0KON 256, FQB 146, IAJ 126, DJJ 104, EUT 72, SAI 59, IXL 43, BXJ 26, KDOW 19, BZC 12, KJP 8, YNA 2. (Nov.) W0BZC 12.

NEW ENGLAND DIVISION

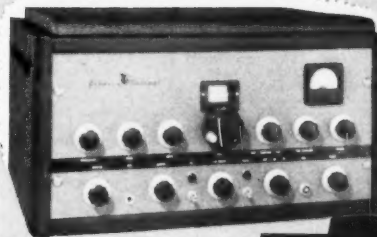
CONNECTICUT—Acting SCM, Roger C. Amundsen, W1HYF—Because of State Guard and other activities VW has given up his PAM and CPN Manager jobs. Harold Clay, STU, of 334 Silver Lane, East Hartford, is taking over both. Please give him your utmost cooperation. Thanks to Ray for the many years of service to the section. VBM is a new YL ham in Norwich. We need a new bulletin editor, as DJV is not able to handle it. Leading CN QNI for December were KYQ 27, HYF 24, LHE 23, LV 20, RRE 18. Fare ones were EFW, ASI, KTO, RFI, DHO, who is new EC for Darien, and LIG. Also WNIUBP was the first Novice to QNI into CTN. SJO leads with a total of 415. EMP, new OBS, is on Mon., Wed., Fri. at 1230 on 3960 kc., at 1800 on 3880 kc. SLM and SLL, of Orange, formerly 3NYN and 30CH, are active on 75 meters. VW took part in the November FMT. BVB is active as OO. LVQ had measles in his family. LV has new TV. UKV is new Ridgefielder. ODW has a new wagon and will put mobile in the old one. NJM spent two weeks at the ECDA confab. 2BMP, secretary of YU, states that the Club is staging a traffic program. All the traffic reports are appreciated, but please send some news along, too. PCH is laid up with a bum leg. AKG is new EC for Shelton. SJO is new OO, Class III, and OPS. Those who have not had their appointments endorsed and who do not report are going to lose them shortly, so get going. What does the gang think about having the section meeting this year at the New England Division Convention in Springfield on June 14th? Would like to hear your opinions. Traffic: (Dec.) W18JO 415, AYC 258, LV 155, HUM 136, AW 112, HYF 109, KYQ 108, RWS 40, RFJ 38, RRE 36, BVB 31, NJM 25, VW 25, BDI 24, LIG 24, ODW 16, KV 15, LVQ 12, CTI 11, GVK 8. (Nov.) W1NIM 56, LVQ 51, NBP 9, YU 3.

MAINE—SCM, Orestes R. Brackett, W1PTL—SEC: IGW, RM: LKP. Net frequencies and time: Pine Tree Net, 3596 kc., at 1900 Mon. through Fri.; Sea Gull Net, 3960 kc., 1730 Mon. through Fri.; Civil Defense every Sunday from 1045 to 1100 on 3965 kc., also Wednesday from 1900 to 2050 on 3961 kc.; Control Station, FKS. Another new ham in Fairfield, UO, is doing a nice job with an HT-9 on 28 Mc. A new Novice in Skowhegan is WNIUTB, the son of FEE, TDK, of Fryeburg, has his new Advanced Class license and is doing a fine job on 3.8 Mc. WNIUNK, WNIUNL, WNIUPX, and WNIUMU, all of Portland and students of Deering High School, are operating on 3.5 Mc. SNE, of Warren, has gone South for the winter, as has PVY, who probably will go to Texas before he returns. A Sea Gull Net certificate was awarded to HXQ, really a regular member. MGR and OEN should be back in Maine before long, after having spent some time going to CAA school. OHT has been calling into the SGN quite often lately with traffic from PTN. PNM must have his new house completed as he is back with us once again. NDC now is living in Winthrop but we don't hear much from him since he got married. SCU finally broke the ice and is on 3.8 Mc. with a swell signal. Traffic: WILKP 127, OHT 98, QQY 56, OLQ 36, HXQ 34, SEJ 32, EFR 31, BTY 30, PTL 23, KEZ 22, HUL 17, FXA 14, W5QCF/1 11, W1AWN 9, QEK 5, SRQ 5, KDE 1.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—New appointments this month: EC: STA for Haverhill, PYT for Ipswich, DHX for Fall River, QW for Newburyport. OBS: QON. Appointments endorsed for another year: ECs: PST Brookline, MRQ Groveland, MZR Topsfield, RSE Whitman, DDC Ayer, KLC Nahant. As OO: RRP. OBS: RRP, BB, MRQ, AQE, PMA, LM. As OPS: MRQ, BB. As RM: AQE for 7 Mc. As OBS: JOJ. Sorry to have to announce the death of two hams, MAL and MEY. Hams on 144 Mc.: AZY, SXD, KO, TTG, KBS, RBN, CTR, EJU, RCY, IVI, and NAV. NZV and QPN are on 3.9 Mc. JCI is on 3.5 Mc. 3QZB gets on at MX, HYZ, LLZ, QIU, LAT, RVK, and BBP are on 28 Mc. Net certificates have been issued to BY, MX, AQE, NCP in the Eastern Mass. Net on 3660 kc. The Mugford twins both have calls now. Russ is UQB and Bob is UMM, new Novices. The South Shore Club had ICP from ARRL at its meeting. The Wellesley Amateur Radio Society is holding code classes. The T-9 Radio Club met at MVQ's QTH. The Eastern Mass. Club had Bob Hall from Workshop give a talk. The Quannapowitt Radio Assn. NCP in Ded. Mahler, of Harvey Wells Co., give a talk on TBS-50s. The Braintree Radio Club held its monthly meeting. RRP gets on at KBN some. HZR got a Bandmaster and is on 3.9 Mc. DHX is active on 144 and 3.9 Mc. GRC, Chatham, gets

(Continued on page 86)

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Final Amplifier: 4D32 with pi-network tank circuit—ganged rotary inductor and variable condenser results in efficient continuous tuning — numerous random length antennas can be matched without external couplers — protective fixed bias applied to 4D32 at all times.

Exciter: 6AU6 Pierce crystal oscillator with electron coupled plate circuit — choice of 10 crystal frequencies with both fundamental and harmonic operation — low crystal current — buffer screen voltage variable for 4D32 excitation control — ample drive on all bands.

Modulator: 6AU6 speech amplifier, 6AU6 driver, pp 807s modulators — designed for use with crystal microphones — nominal 500 ohms output impedance available for driving high powered modulator.

Power Supplies: 5Z4 low voltage rectifier, 6AL5 bias rectifier, parallel 5R4GY high voltage rectifiers — transformers supplied for 115 volt 50 60 cycle operation only — power consumption 375 watts with transmitter fully loaded on phone.

Physical Description: Cabinet 11 $\frac{3}{4}$ " x 15" x 21" with dark maroon wrinkle finish, hinged top cover — panel gray 8 $\frac{3}{4}$ " x 19" with matching maroon trim — dials are special for the transmitter, maroon phenolic with satin chrome skirts — net weight of assembled Viking I, 69 pounds. JOHNSON VIKING I KIT, complete, less tubes, crystals, mike and key

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JOHNSON SPEED KEYS

A variety of models to choose from — every one a quality key. All have live steel vibrator spring: complete pivot, contact and excursion adjustment, damping wheel and adjustable paddles. A wide range of speed adjustments plus heavy or light dots, as you like. 114-501 Beautiful chrome finish, heavy steel base 6 $\frac{1}{4}$ " x 3 $\frac{1}{2}$ " x $\frac{1}{4}$ " with four non-slip rubber feet. All machine parts heavily chrome plated, $\frac{1}{4}$ " coin silver contacts. Equipped with circuit closing switch. Net weight 4 $\frac{1}{2}$ lbs.

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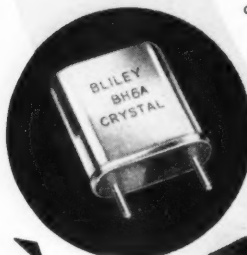
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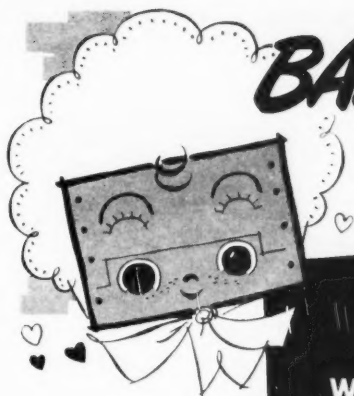
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in the KP4 net each Monday at 6:45 on 3560 kc, and some in the Eastern Mass. Net and other nets with ARC-5 and BC-348. EMG has a B&W model 504 frequency multiplier. TY relayed traffic for the Hobby Show in Marblehead. PEX., of Lexington, has sked with AD in Bellows Falls, Vt., daily. He also is in the General Radio Net. BB is busy with 1.8-Mc. DX tests. QON is in Deep Sea Drag Net on 3.9 Mc. New hams in Lynn: Tom Eichelburger is WN1UNA, his XYL is WN1UMZ, Dick Ward is TUT. New officers of the Old Colony Amateur Radio Assn. are SUR, pres.; ODQ, vice-pres.; KGF, treas.; LNN, secy. Meetings are held at the Community Club House in East Foxboro. SUR has mobile rig in his car. ODQ, TPZ, TQF, SUR, and FGT put on a demonstration for local e.d. heads. ABA, of Belmont, is back on the air, after a lapse of 30 years, with a Iyeco 6008. MRQ is a major in the CAP. DDC is working at M.I.T. and is on 1.8, 144, 3.5, and 7 Mc. PLQ, Watertown, EC, has the following working with him: ADL, AKD, OMD, IND, LNX, MR, PAG, and QCK. HP has a mobile rig. Gypsy Radio Club members who attended the auction held by the Yankee Radio Club were SNZ, ICH, HP, QUV, PIY, TQU, and Bill Tift. HKK, who was in Europe, had a QSO with HCH. HQO has a rig in his car on 3.9 Mc. QW is busy with CAP work and has been working with e.d. director and is on 7- and 14-Mc. c.w. CTW, WB, BL, DFS, TQP, and ALP attended a meeting at M.I.T. on frequencies for the State's e.d. work. Bud Fischer, Roger McCoy, Bob Colburn, and Ed Loring, members of the Wellesley Amateur Radio Society, passed their Class exams and are awaiting licenses. WN1URQ is building Eldico transmitter. FL has been in Alabama but is moving to Kansas City, Mo. BIO has 813 on 28 Mc. ONV is issuing a list of Novice amateurs at \$1.00 for 10 issues. NBN is NCS for Region 4 Net on 29,542 kc. Wed. at 9 p.m. MGP has sked with ZU on 3.9 Mc. The 160-Meter New England Net is on Thurs. at 7 p.m. on 1805 kc. Class all states report in. PXH, BGW, and BGH took part in the Frequency Measuring Test. PFY, WN1UEI, and WN1TWG are on 144 Mc. WN1USM is new in Charleston. AO and VT are on 3.5-Mc. c.w. TTS, in Saugus, is on, too. FIN's girl is WN1TTE. New officers of the So. Eastern Mass. Amateur Radio Assn. are AVY, pres.; LAZ, secy-treas. All Massachusetts amateurs are urged to get behind the new drive to get call-letter license tags. Letters have been sent to all Senators and Representatives in Massachusetts. Support House Bill 610. Traffic: (Dec.) WIEMG 388, TY 359, SS 308, LM 271, JCK 174, NUP 119, DMS 110, UE 106, WU 23, CTR 13, THU 12, HWE 9, PEX 8, BR 4, NWL 4, QON 4, AVY 3. (Nov.) W1PEX 13.

WESTERN MASSACHUSETTS—SCM, Victor W. Paonoff, W1EOB—SEC: JYH, RM: BVR, PAM: RDR. WMN meets Monday through Friday on 3725 kc. at 7 and 10 p.m. The Net is operating at slow speeds to encourage newcomers to participate. Everybody is welcome to join in. It is with great sorrow that I report the passing on of W1GZ. Nes had been doing an excellent job with the e.d. nets in Region 9. His guiding hand will be sorely missed. COI is working JA stations with regularity. TZA is a new member of WMN. MUN is back on the air and continuing with his precision frequency measuring. Latest test results show 1/2 part/million average error. BKG also is doing very well with 4.9 p.p.m. error. KC's emergency power is in good operating condition. Loss of feeder cable in his neighborhood required 24-hour workout of gas-driven generator. AGM joins e.d. nets from mobile rig. BDV is busy developing electronic gadgets for school. RHU claims it took only two afternoons to rebuild his final in a TVI-proof fashion. It can be done, fellows. New ECs are CLO, No. Brookfield; NZD, Auburn; and NAK, Milford, Mass. It is urged that all e.d. nets register themselves with ARRL. Advise the time and frequencies used by your net for inclusion in the net directory. Equipment for Region Headquarters stations is now being furnished by the State. YL WN1UKR became member No. 125 in the Hampden County Radio Club. Another new ham is WN1UMF in Springfield. Traffic: W1BVR 101, RHU 74, NLE 34, QJN 21, MOK 9, GWJ 6, AGM 4, CJK 4, TAY 4, BDV 3, RRX 2, TZA 2, IMF 1.

NEW HAMPSHIRE—SCM, Norman A. Chapman. W1JNC—RM: CRW. Something should be said about the lack of amateur activity reports in this section. First: We have been without a Section Emergency Coordinator since last June. You fellows have been well aware of this condition. How about some cooperation; recommendations of "the man" to fill this important vacancy? Second: How about reactivating our Emergency Nets which operated on 3685 and 3890 kc.? Remember civil defense is your job. What are YOU doing about it? Third: We need Emergency Coordinators in Coos, Carroll, Strafford, and Sullivan Counties. I ask you fellows in these counties to get busy and pick a Coordinator for your individual county. Let me hear from you. Fourth: To you fellows who already hold appointments as Emergency Coordinators or Asst. ECs, remember there is work to be done. Are YOU doing all you can to promote civil defense in your county? Are you in touch with e.d. directors? Got all amateurs in your area signed up? Fifth: To make this column of increasing interest, send in those monthly activity reports by the third of each month! Traffic: (Dec.) W1CWR 1268, SAL 150.

(Continued on page 88)



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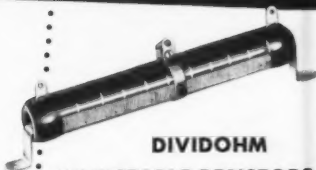
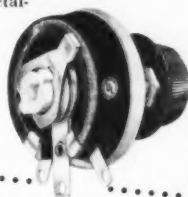


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These wire-wound vitreous-enameled resistors, with one or more adjustable lugs, provide a convenient means of obtaining odd resistance values. Stock units made in 10, 25, 50, 75, 100, 160, and 200-watt sizes, in many resistance values.

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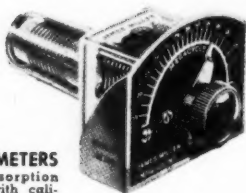
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JNC 71, PFU 63, QJX 25, PBE 20, TBS 20, POK 6, JGI 4. (Nov.) WICRW 429.

RHODE ISLAND — SCM, Roy B. Fuller, WICJH — SEC. M.J. RM. BTU. RIN meets Monday through Friday at 1900 on 3540 kc. The section traffic men are spotlighted in this report for their usual rush of Christmas messages; much time was devoted by them in getting traffic to its destination. The AQ Club station is Rhode Island representative to the 1st Regional Net on Fridays and also looks for ragchews on 144 Mc. this same evening. Newport will hold its bi-annual elections and the new officers will be installed at the annual dinner held at the Muenchinger-King Hotel. BGA is on s.s.b. CPV has a new blackbox VFO for mobile operation and reports that it works fine. WNUBJ is the newest ham reported this month. The NAARO will set up its emergency net on one of the new c.d. frequencies. RVQ now is on 75-meter phone. Traffic: WIBNH 125, HLY 115, QR 64, CPV 57, TRX 50, OIK 45, TKX 43, AQ 20.

VERMONT — SCM, Raymond N. Flood, WJFP — Hi, gang, haven't received any news items from you. Guess you've been too busy with traffic. Our totals are going up steadily. FB, Vermont boys in the 43rd Division in Germany have a BC-610 on 14 Mc. with the call DL4KK. Be on the lookout for them. The Tri-County ARC showed G. E.'s latest film, "And a Voice Shall be Heard." Town and c.d. officials were invited. This film is a "must" for all parties concerned. Please return the yellow card sent with your Green Mt. Static if you haven't already done so. The Voice of America recently featured a recorded interview with FPS. Traffic: WIRNA 279, OAK 151, AVP 86, IT 55, FPS 41, TAN 38, BNV 27, ELJ 24, TXY 18, BJP 6.

NORTHWESTERN DIVISION

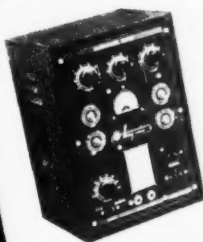
ALASKA — Acting SCM, Jack Walden, KL7BK — Most of the traffic handled by AIZ is for servicemen. They relay in the Far Eastern Net, plus handling the major part of the general Alaska traffic. Traffic: KL7AIZ 614, YG 114, PJ 110, ALD 44, AGU 14, UM 13, ALI 3.
IDAH0 — SCM, Alan K. Ross, W7IWU — Burley: HAH reports the Magic Valley Radio Club held a banquet with Dr. Mohlmer and W. Lottridge showing slides and moving pictures. Attending were VAC, MJZ, JHY, NRY, NGN, FT, MCM, HST, JBK, DIA, and HAH, also Bill Slusser, a W2. Twin Falls: OQT reports officers for the Keys and Mikes Radio Club are PDM, pres.; NGA, vice-pres.; OQT, secy-treas. Hayden Lake: FIS received a Bendix TA-12 for Christmas from the XYL, Nampa: A civil defense parade and communications drill under EC ETU was held Jan. 13th. Control station was GPM. Mobiles participating were IZM, PIT, and NPO, of Nampa, and FOF, DOIH, and AHS, from Boise. IYC manned a home station. Boise: Gen State Radio Club officers are IWC, pres.; GHT, secy-treas.; CDR, SHN, and FOF, directors. Check in on the Inland Empire Emergency Net, 1995 kc., Sun. and Wed. at 8 P.M. MST, those of you on 160 meters. Traffic: (Dec.) W7NH 472, GHT 128, EMT 28, FIS 24, LQU 8. (Nov.) W7NH 235, GHT 50.

MONTANA — SCM, Edward G. Brown, W7KGJ — The Gallatin Radio Club has started to work on its mobile emergency unit under the direction of NUS. ED's jr. operator now is stationed at Mountain Home AFB. ED checks in nightly to receive traffic from Lee via ABK. JDZ is active in FARM and TCPN Nets. LOD is back in business through KTX and others after blowing the transformer in his HT-9. CT is new OBS and BSU is new OO. LBK is back on the air with controlled-carrier using p.p. 818c. CPV is spending a few months in Mesa, Ariz. SAW is installing his 10-meter mobile unit. MKB received his "Greetings." QGJ, a new ham in Laurel, is using Command transmitter on 3.5 and 7 Mc. BNU is undecided where to vacation; Deek says Arizona and his XYL says Florida so it probably will be Florida. Thanks to JOI for the card reporting his XYL's Novice call. Congratulations to WNTPRE, who probably is the first Novice call in Montana. Skip conditions still are causing some trouble but net activities continue to improve. Traffic: (Dec.) W7KGJ 426, JDZ 171, CT 148, CVQ 54, COH 37, BNU 20, LBK 20, EGN 6, LCM 3. (Nov.) W7LBK 53.

OREGON — SCM, J. E. Roden, W7MQ — WJ is new RM for Oregon, and wishes to have a lot of the old Oregon brasspounders formerly on the c.w. nets contact him in reorganizing the c.w. picture in Oregon. WJ is high-point man for Oregon traffic handled this month. EJ now is located in Cascade Locks and still is with the Forest Service and also much interested in the AREC. GCT makes BPL this month with a total of 742. LYN is new OO. Class I and III. BDN reports successful operations of AREC in emergency near Pendleton with a lost plane hunt in which the local amateurs as well as the Walla Walla amateurs were commended by the press and officials for a job well done. IE also makes BPL with a good total of 371 originations. JLU has been doing a swell job as OBS on 29-14-, 3.0- and 7-Mc. bands. AFE, besides doing a neat job as NC on OEN many times this month, also makes BPL with a score of 568. PFM now is located in Pendleton, having moved from Ashland. He is with the local Telephone Company, and also is active on the 29-Mc. band and has FB mobile. HDN, Oregon SEC, also had a good traffic

(Continued on page 90)

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C

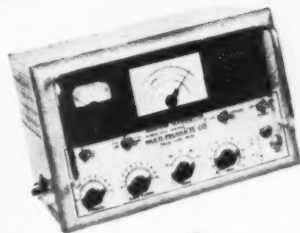
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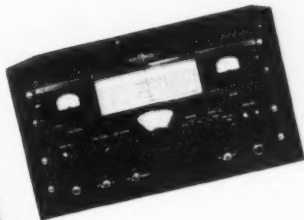
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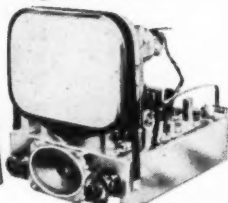
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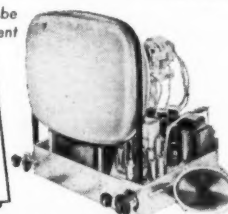
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month and made BPL with his total of 588. The Eugene gang is encouraging early registrations for the big OARA Convention to be held the latter part of April. Traffic: W7WJ 809, GCT 742, HDN 588, APF 568, IE 371, ADX 155, GNJ 113, AJN 91, HJU 59, AWI 44, BSY 36, TH 34, MQ 30, GWE 27, MLJ 27, AHZ 23, DHX 21, FY 18, AXJ 13, EUG 12, HDN 11.

WASHINGTON — SCM, Laurence M. Sebring, W7CZY — SEC; BTV, PAM: NRB, RM: FIX. The first Extra Class license was issued to BA, with VI getting No. 2 in this district. The results of the WARTS election are: LFA, net manager; JPC, assistant; CKT, MBY, GRM, and BBK, directors; MTX, secretary. Conditions have been bad for KCU, ETO, and TH, unable to hear west-side stations. Don Exner, jr., passed General Class exam so has dropped the N. ANZ modified his 75A-1 with good results. MEU has a new tower for his beam. PGY remodeled his shack and installed a console, drapes, and daveno. CLZ has a new modulation system. NJ is using a 75A-1 and 32V-1. OYO now is on 14 Mc. with a kw. Officers of the Richland Amateur Radio Club are: MLZ, pres.; OAF, vice-pres.; OMB, secy.; KIN, treas. BNT is getting back on the air. PSP had his tower blow down in the gale, but has a new mobile rig. LEV is on 10- and 75-meter mobile. CBE built a fine audio amplifier for the XYL's record-player. LEC has his 10-meter mobile working at last. JJK is stationed at Camp Cooke, Calif. MTX has 75-meter vertical antenna. HMQ is on 28-Mc. 'phone with an 832A final. GWK has a TBS-50. MCU is attending electronics school at ICGS. OEB made 242 contacts in 60 sections during the 88. TS, KGQ, KO, MIG, BYK, FIM, and FAY are active on 50 Mc. Traffic: (Dec.) W7CZY 2431, IOQ 1829, BA 642, FRU 394, EVI 218, FIX 158, FWD 87, PGY 82, ETK 51, KCU 50, OEB 44, EHH 40, EVW 37, NWP 37, LEV 32, KTL 20, ETO 9, APS 6, ZU 6, CWN 3, GAT 3, NRB 3. (Nov.) WTH 195, JZR 24, NTU 18, ETO 12.

PACIFIC DIVISION

HAWAII — SCM, John R. Sanders, KH6RU — Officers for '52 of the Maui Club are: ABF, pres.; ABD, vice-pres.; OL, treas.; ABY, secy. A drive to reactivate the Hilo Club is being made by AIE, AFQ, AFS, AFR, and VO. These fellows have placed ads in the Hilo paper offering free code and theory lessons to anyone aspiring to become an amateur! ABY, aided by DK, ABF, MG, and VG, has formed a 28-Mc. 'phone net on Maui. PX has 35 watts on 7 Mc. RX relayed numerous Christmas greetings home for the boys out west. AFC is on 3.9 Mc. and joins the increasing number now utilizing the interisland net. K5 took a trip to Guam. EU is back on 3.9 Mc. after a long sojourn on the CAP channels. ADY now claims 165 KH contacts. TS is attempting to copy the WIAW Official Bulletins in order to relay the latest news on his OBS schedules. RU anticipates visiting the other islands more frequently now that he is maintaining the Matson Fleet radars. Far Pacific Area: JA49I will next be heard from W4-Land. KG6FAA had 49 'phone patches and joins KG6AAY for BPL for December. KG6FAA had an all-time high traffic total of 5429 for September but the report was lost in transit. Traffic: (Dec.) KG6FAA 2512, JA2KW 1892, KG6AAY 784, KH6ADY 25, TS 25. (Nov.) JA4AI 320. (Sept.) KG6FAA 5429.

NEVADA — SCM, Carroll W. Short, jr., W7BVZ — SEC: JU, ECs: IJ, JLM, JVV, KIO, KOA, MQ, TJY, VO, and ZT. RM: PST. OPS: JUO, OO: LGS. Nevada State frequencies are 3660, 7225, and 29,360 kc. How about more of the gang showing up on 3660 evenings? PFG is on 3860 kc. regularly. JOS is on 7225 kc. week ends. NRU divides time between 7-Mc. c.w. and 3.8-Mc. 'phone. KJH is on 28 Mc., his 7-Mc. rig is haywire. EEF is helping JLM build at his new antenna farm. IWE/7 is active in Reno on 7- and 14-Mc. c.w. KKK and JLM were in the 88. DVJ is on 3.8-Mc. 'phone nightly. MRN skeds 0LZY to QSO the old home town. SXD has a new SX-71 and is active on 7-Mc. c.w. and 28-Mc. 'phone. KIO is QRL, revising the Southern Nevada Club's constitution! JUO is fixing up his old Breting to sell. ZT is on 3.8-Mc. 'phone. NWU is on 7-Mc. c.w. and 28-Mc. 'phone. KEV skeds 0ITE, ex-7KWZ. LVP is on 7 Mc. occasionally. Meet your SCM daytimes on 7225 kc.

SANTA CLARA VALLEY — SCM, Roy I. Couzin, W6LZL — With the close of December, radio clubs and hams in general can look back on a full year of activity. Now, with officers elected for the coming year, let's all get behind them and participate 100 per cent on all projects. The SCARA and the NPEC held very fine Christmas parties. FYK is rebuilding and will have 880 watts on 7- and 14-Mc. c.w. He worked EI9N using 20 watts recently. NW still is able to check in on the nets and handle a small amount of traffic although time is limited. AEV sent in a fine report on the SEC situation. The report is not yet complete as there still are a few clubs to visit and a few changes to be made. The North Peninsula Electronics Club has a 144-Mc. project underway for all who wish to participate in c.d. work. QIE still is holding code and theory classes and getting amazing results. MMG is checking into the nets when possible and getting ready to take over as secretary of NPEC. BPT did a bang-up job on his

(Continued on page 92)

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traffic this month and made BPL both ways, originations and total. HC was out of town the latter part of the month so has a small traffic total. He has suggested the organization of a Santa Clara Valley Net to tie into the newly-organized East Bay Section Net. K6WAE again comes up with a fine total even though the station was closed down for a Christmas vacation. CIS was low on traffic but busy as a bird dog doing what a good Director ought to be doing. Traffic: W6BPT 1007, K6WAE 895, W6HC 46, CIS 21, NW 18, MMG 14, FYK 6.

EAST BAY—SCM, Ray H. Cornell, W6JZ—Asst. SCM, Guy Black, 6RLB, SEC: RVC, RM: IPW, ECs: AKB, IDY, QDE, TCU, and WGM. The Oakland Radio Club sponsored a Christmas dinner party in San Leandro Dec. 12th for the East Bay amateurs. The Richmond Radio Club held its party at El Nido near Lafayette Dec. 23rd. The East Bay Radio Club celebrated at the home of KEK. The Mt. Diablo Club had a very enjoyable evening at Bertolas in East Oakland Dec. 18th. Dinner, dancing, and good fellowship were in evidence at these parties and everyone had a fine time. It would be nice to have one big party for the whole section next year. Anyone interested? The East Bay Section Net (EBSN) made a good start; 16 different stations checked in to 23 sessions and handled 89 messages. The Net meets at 1900 PST Mondays through Fri. on 3635 kc. A Tri-Section Net (BAN) comprising the San Francisco, East Bay, and Santa Clara Valley sections was activated on Jan. 14th, time 2030 PST, frequency 3635 kc. RM for both Nets is IPW. Here is a list of new officers of the various clubs: NBARA—WHA, pres.; CHL, vice-pres.-treas.; JDO, secy. Monthly meetings are held the 1st Fri. Richmond Amateur Radio Club—JCH, pres.; VVZ, vice-pres.; HFM, secy.; EJA, treas.; EFD, sgt.-at-arms. Monthly meetings are held the 1st Fri. SARO—BS, pres.; BEZ, vice-pres.; K6AY, secy.; NZG, treas.; BEZ, comm. mgr. Meetings are held the last Mon. East Bay Radio Club—RLB, pres.; DNX, vice-pres.; NJO, secy.; JK, treas. The Club meets once per month. Mt. Diablo Radio Club—K6AQ, pres.; HFC, secy.; JCH, corr. secy.; DMA, rec. secy. Meetings are held the 3rd Friday. Oakland Radio Club—AKB, pres.; NTU, vice-pres.; KTL, secy.; YDP, treas. The Club meets the 1st & 3rd Thurs. (Specific information as to club meetings will be furnished by your SCM upon request.) RVC, our able SEC, spent two weeks at St. Mary's College undergoing training in civil defense. EC appointees are: AKB, Oakland-Alameda; IDY, Martinez; QDE, Richmond; TCU, Walnut Creek; WGM, Vallejo. Cdr. Jim Steidley was the speaker at the NBARA January meeting. JDO has a new 10-meter beam. W6DIB is a new Novice in the Vallejo Area. QDE is recuperating from flu. W6NBI has changed call to W6NBI. TI cleaned up some key clicks. He has 294 countries now. CGG has rebuilt around the old pair of 4-125As. He's sporting a new storm-proof 20-meter beam and handling traffic from Japan. Traffic: W6IFW 408, JZ 261, HOR 197, LYL 85, YDI 5.

SAN FRANCISCO—SCM, R. F. Czekowicz, W6ATO—Phone: JU 7-5561. SEC: 6NL. Phone: PL 5-6457. **Santa Rosa Area:** EC: LOU, Asst. ECs: DRX, DZM, and HQN. The 2-meter net for c.d. activities meets every Tuesday at 8 P.M. on 145.35 Mc. A new 10-meter net with approximately twelve stations now is active on Wed. at 8 P.M. LOU has taken over the post of EC, while IEN has taken over the secretarial position for SCRA. MTH is quite proud of his XYL (HHH) now that she has that Advanced Class ticket. DRX also made the grade for Advanced Class. The XYLs prepared a pot-luck dinner for the OM's at the Club's annual shindig at Agua Caliente. K6CR, of Sebastopol, has joined the Club. The Sonoma County Radio Amateurs Club meets the first Wednesday in the Tap Room of the Grace Bros. Brewery, Second St., west of the Freeway, Santa Rosa. **Eureka Area:** EC: SLX. FYY has installed a new 75-meter mobile, while ZEK has modified his mobile for both f.m. and a.m. BJO is building a new rig for KGF; BME is in sad need of a new power transformer. FYX is one of several 2-meter mobiles which are gaining favor in this Area. SLX would like a schedule with his son on Whidby Island in Washington. ZSE is DXing on 7 Mc., and EQQ is rebuilding. CWR is DXing on 14 Mc. AXY is sporting a new 10-meter beam. KH6-ABH W6 is a newcomer in Eureka. FCR is trying a Clemens match on a 10-meter beam. MCC is attending telephone school in San Francisco. It is hoped that LE's XYL now has fully recovered. The Humboldt Amateur Radio Club meets the 2nd and 4th Fridays, YMCA rooms, rear of Mun. Auditorium, "E" St., Eureka. **Marin Area:** EC: KNZ. Tamalpais RC EC: ZIB. The Marin Amateur Radio Club has begun reorganization, ably headed by Chairman LTC, who has presented a number of excellent ideas, including the reactivation of the Golden Gate Net. The GGN will meet on 28,700 kc. at 8 P.M. Tuesday, with LUM, BCM, LEH, LTC, TIJ, and K6BU on the roster. All others are invited to participate. The Marin Radio Amateurs Club meets the second Friday in the Engineering Lecture Room, College of Marin, Kentfield. The Tamalpais Radio Club meets the third Friday in the new quarters of OZC on Vistazo, near Centro East, in Tiburon. **San Francisco Area:** EC: BYS. The AREC Net meets every Monday at 8 P.M. on 147.15 Mc. All are welcome. W6NCK now is

(Continued on page 94)

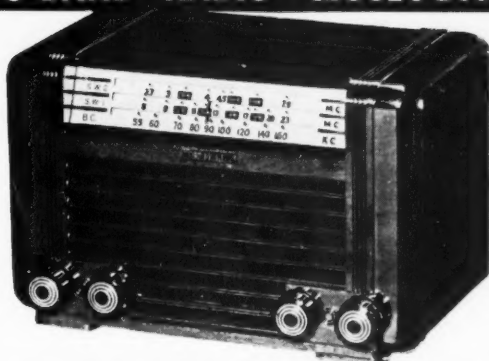
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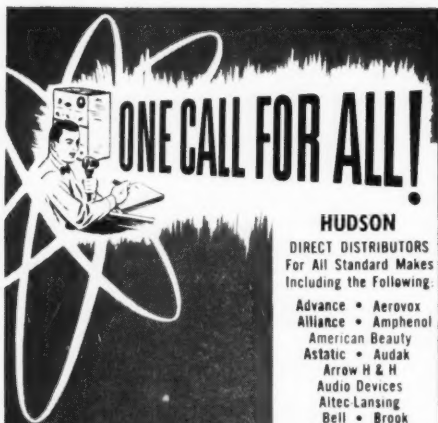


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W6NCK, Peggy Detsch, the XYL of GCV, received both W6NCK and W6PCN. JCG and LU are checking into the new East Bay Net. JCG also checks in on RN6, but advises that San Francisco needs another station (or more) with more power than his 35 watts for the RN6 traffic. HJP is signing DL4HM and using BC-610 and a 12-wave-length-per-leg "V" beam on 14 Mc. SR is bragging about his new Collins receiver. The San Francisco Radio Club meets the fourth Friday at 1641 Taraval St., and the High Frequency Amateur Mobile Society meets the second Friday at the Red Cross Bldg., 1625 Van Ness Ave., San Francisco. My term as SCM is drawing to an end and inasmuch as I have received the honor of representing the Pacific Division as Vice-Director for the next two years, I am NOT a candidate for reelection as SCM. My thanks to all for their support and assistance. Nominate and elect as SCM a man who will work strenuously for your best interests, as I have tried to do. Traffic: W6JCG 134, FVJ 25, ATO 8.

SACRAMENTO VALLEY — Acting SCM, Willie van de Kamp, W6CKV, Northern Area; Asst. SCM, Edward M. Cripps, 6YNN, IEO, in Korea, wrote a letter to the SCM and says "hello" to the gang. CFU and JDN handled traffic for SPRR during a recent storm. Central Area: Asst. SCM, Willie van de Kamp, 6CKV, JRT now has Advanced Class ticket. RCY now is located in Los Molinos. HBM used 10-meter mobile for home contacts on trip east. KY finally got on the air from Chico. New officers of GERC are CKV, pres.; HNL, vice-pres.; TID, secy-treas. AFK is wintering at Lake Tahoe. Southern Area: Asst. SCM, Richard M. Hall, 6ZYV, GDE, stationed at Fort Monmouth, spent Christmas furlough at home. EUX now is on 28 and 144 Mc. EII and KKI are on 28 Mc. The SARC held a splendid Christmas party Dec. 17th. The O'Brien clan of HTS, HSB, and GDO moved to a new location. JEG is vacationing in Southern California. Traffic: W6JDN 217, PIV 148, ZYV 81, KRX 47.

ROANOKE DIVISION

NORTH CAROLINA — SCM, J. C. Geaslen, W4DLX — I want to explain why the SCM has been off the air for the past month or so. I have been digging a new basement under the house, putting down a concrete floor and laying cement block walls. I'm installing an oil-burning hot-air heating system. This is the longest period away from my hobby in years, but in so doing I have found 4000 more minutes and saved myself about \$600 so it's been worth it. JPY, Elizabeth City, now is Advanced Class and has joined the Tar Heel Net. Another top-notch c.w. man gone wrong. Hi. The Northeastern Amateur Radio Club has new officers: JPY, pres.; NBR, vice-pres.; NRR, treas.; Carlyle Horner, secy. RAZ, Raleigh, sends in an excerpt from the MARS Bulletin in which RHH, of Morganton, is written up as the MARS "Station of the Month." Congrats, Riley, and more power to you. LWU, Goldsboro, reports a new club there, the Wayne County Radio Amateur Assn., with HBQ, pres.; NZS, vice-pres.; LWU, secy-treas.; GJS, KMV, and TMQ, tech adv. comm. IFR, Clinton, reports DCQ, former SCM, still is at Corpus Christi, Tex., but hopes to be back in this area soon. The Mecklenburg Amateur Radio Society, Charlotte, has new officers: OQK, pres.; FUA, vice-pres.; DLX, secy.; CAY, treas. Our ever-growing mobile gang on 75 meters is upped by two more: ROD, Cherryville; UEG, Charlotte. Rumor has it that CVQ has dreamed up a new mobile antenna and soon will be on 75-meter mobile. Traffic: W4RRH 81, AKC 80, CVQ 4, LWU 4.

SOUTH CAROLINA — SCM, T. Hunter Wood, W4ANK — Congratulations to OGG on making the BPL, W4UES, ex-ITBB and 5PGX, is new in N. Charleston on 7-Mc. c.w. AZT reports that W4UIK is new in Greenville, FBR is new on 3.8 Mc., and the Greenville ARC held a dinner Jan. 14th. DX reports ULH on 160 meters from Florence and W4ULF is new in Batesburg. JCM and MPR are new on 3.8 Mc. HEV has been transferred to Austria for three years. W4TWX and W4TWW report the following active South Carolina WNs: W4UED, Columbia; UQO and TPE, North Charleston; THH, Greer; PQN; Johnston; UFP, Hartsville; TOP and TMD, Fort Jackson; UNO, UNV, UMW, UMP, UOS, and TNG, Rock Hill, with UOS and TNG, a father-son team, the son W4F1. DCE reports five new licensed members of the Dupont Radio Club with three receiving operator licenses only and new calls UHR and UVK. All South Carolina WNs interested in a South Carolina Novice net are requested to drop a card to the SCM giving call and mailing address. Traffic: W4ANK 634, OGG 577, FFH 64, AZT 16, FM 10. VIRGINIA — SCM, H. Edgar, W4F1, has a new W4F1. NAD, the SEC, MWH, IA, PXA, and SDK are RMs. The PVRC and the Frankford Club met at Philadelphia in joint session for the third consecutive year to jib and tease each other as victor or vanquished in the last SS. Unofficial rumor has PVRC in front. Attending from W4 were SZY, NTZ, IA, KPC, PNK, and FF. Included as guests of the W4s were K1ZABH and DL4AG. TX has a net up 48 states and 4 VE sections, plus Cuba, using 18-watter 6L6. Twenty-six fixed stations and 11 mobile units, staffed by 35 RACES "hams," participated in a recent emergency (Continued on page 96)

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drill withstanding the rigid inspection of General R. L. Tilton, Civil Defense Administrator. The RACES group was accepted as official emergency communications under a joint plan comprising Hampton, Elizabeth City County, and the town of Phoebus. Drills will be held the second and fourth Sundays of each month. Net Control Station equipment donated by local hams was converted to meet emergency communications standards by RTZ, RGN, NYT, JCM, and OIM. AJA is Chief of the C. D. Section of RACES of the aforementioned gang. FF claims to be the recipient of the first Amateur Extra Class license issued by the FCC. New ORS appointees: SHJ and SNH. EC renewals went to AJA, AKN, CZK, JAQ, ONV, KRG, KMS, JDB, and NV. New EC for Portsmouth is 7JGM/4. Net certificates were issued to CFV, FV, IA, IYL, KDL, KSW, MWH, NV, NAD, NBA, PXA, RYS, SAD, and SNH of VSN; KDL, FV, IA, KFC, KSW, KY, MWH, PXA, RYS, SNH, SUN, and SHJ of VNE; MT, MBE, MUD, ORN, PYC, RLA, LTZ, and SIE of VFN. Honorary certificates were given 3UF and 3AVL for their fine attendance and help in QSPing other nets. WN2KJE/4, at William and Mary College, informs us that 4PYN is being reactivated. HQN is using that heralded 7-Mc. rotary beam sky wire and has 3 kw. rpgs strewn around the shack. KX is rebuilding. CFV is VFO all bands. Traffic: (Dec.) W4MH 343, PWX 242, HQN 204, PXA 401, NAD 41, KFC 84, FF 76, JAQ 76, IA 63, SHJ 46, NV 42, NAD 41, CFV 40, LK 27, ORN 23, IYI 8, TFX 6, KMS 4, WN2-KJE/4 2. (Nov.) W4PWX 201, NBA 38, KMS 4.

WEST VIRGINIA — SCM, Donald B. Morris, W8JM — Congrats to WN8LHF, the XYL of VPO of Beckley, who recently received her license. New amateurs in the Fairmont Area are ISA, ISB, ISE, IJC, and OMK, with Novices ITP and HUM. At Princeton there is JBE, and HYM is at Rock. FUS, at Tanner Gilmer Co., is a good contact on 3.8-Mc. 'phone for working West Virginia counties. YPR continues liaison work between 'phone and c.w. nets plus 160-meter activity. DFC reports good attendance at the Princeton Radio Club meetings. The following stations reported in W4V Net during December: ALJ, GCZ, DFC, GEP, YPR, BWK, RWL, EFK, GGC, EZR, PTJ, HUG, BTU, CNF, FVO, TPO, and DWA. A total of 96 messages was handled. GFB built new Clapp VFO and reports FB signals. AHF is active on 3.8-Mc. 'phone after an illness. ELJ and DYP continue to trade equipment. Continued cooperation among amateurs in the Kanawha Valley has resulted in an excellent E.C. program with a station in Red. New building and many mobile units on spot frequency on 10-meter 'phone. Reports are appreciated from new stations throughout West Virginia. Traffic: W8AUJ 508, BTU 210, YPR 65, BWK 50, DFC 29, GFB 28.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, M. W. Mitchell, W0IQZ — SEC: KHQ, Asst. SEC: PGX, RMs: LZV and ZJO. PAM: KHQ. ZJO writes that this will be his last traffic-handling report. He says that because of the tremendous load of traffic his fist has deteriorated considerably and so has his disposition. For these reasons he is giving up traffic-handling for some time and is going to utilize his time in building and many mobile units on spot frequency on 10-meter 'phone. Reports are appreciated from new stations throughout West Virginia. Traffic: W8AUJ 508, BTU 210, YPR 65, BWK 50, DFC 29, GFB 28.

UTAH — SCM, Leonard F. Zimmerman, W7SP — NUZ (Lt. Col. H. B. Whitehouse) left for an overseas assignment, leaving the UARC without a president and the Utah MARS Net without an NCS. Whitey says to keep an eye on 14 and 28 Mc. and we will be hearing from him soon. KUX has been silent for some time as the operator has been wintering in California to escape the rigors of the Utah winter. The UARC Ten-Meter Mobile Net boys and girls are all set to take some more police and defense training. Let's see, they are special Salt Lake City Police and special State Police, now — Deputy Sheriffs next? UTM says he got the Power Company to install a new pole transformer for him. It improved the regulation but didn't help the power leak. ZDX says he finally got a younger ham to put up the antenna at his new QTH. Traffic: W7UTM 215, JVA 25, SP 14.

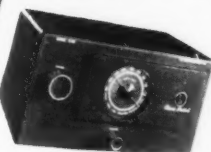
WYOMING — SCM, A. D. Gaddis, W7HNI — In this corner of "Double You Seven-Land" PKX and LUV de-

(Continued on page 98)

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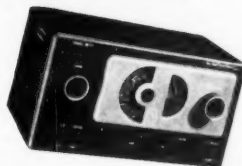


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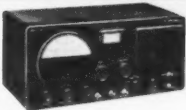
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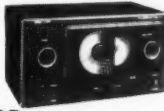
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serve a big hand for their efforts in traffic work. Contact them for traffic in any direction. KFY has the rig on 160 meters. GS is back on the air after a long absence. Welcome back, Hank. PMD is NCS for Intermountain Net on 160 meters. Esther has spring work lined up for GOH. JJO is on 75 meters in Laramie. NOU swiped HNT's mike, who got it back with interest. The Sheridan Club has a beginner's class with 10 members. FB, gang. The Casper Club is starting work on the '52 hamfest. It should be the best ever. Send your ideas on the Test to LKQ. Traffic: W7PKX 320, HNT 9, LUV 5, KFY 4.

SOUTHEASTERN DIVISION

ALABAMA — Acting SCM, Wm. H. McGowan, jr., W4RTI — SEC: ISD. HEP has resigned as PAM of AENP and FGT has been appointed PAM of the Net. Ralph did an exceptional job as manager of the phone net. FGT and OKJ are carrying on in fine style as NCS. Activity on AENP has picked up considerably. EJZ, SUF, OAO, and KIX are representing Alabama in the National Traffic System. KCQ, ELX, TXK, LRU, KUX, GOF, NJP, and WN4TLV, all of Tuscaloosa, and FSW, FIG, and RTI, of Birmingham, are active on 144 Mc. In one night FSW worked 6 states on 144 Mc, making 26 contacts. KCQ, ELX, FIG, and NJP also had good luck the same night working 4 or 5 states each. ELX spoke to the Birmingham Club on "The Story of X-Ray." EBJ is new president of the Birmingham Club, with GET, JJB, RKS, and MSF also holding office. The Birmingham Club has completed its portable power unit having it mounted on a trailer. LEN decided to remain a Rebel and now is living in Tuscaloosa. UIZ is a new YL in Birmingham. GJW is having good results with new four-band antenna. EJZ has a Q5-er and audio filter. KIX still is rebuilding to eliminate TVI. MVM has passed Extra Class exam and is sweating out ticket. PPK's father is expecting his Novice ticket any day. Traffic: W4EJZ 209, KIX 130, SUF 93, GJW 50, OAO 42, PPK 35, MVM 12.

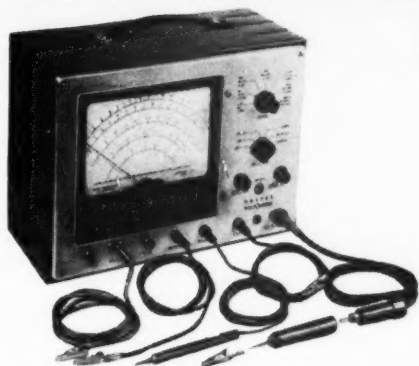
EASTERN FLORIDA — SCM, John W. Hollister, jr., W4FWZ — OXD, of Jacksonville, had many QSOs with Capt. Carlsen, 2ZXM, of the ill-fated *Enterprise*. PJI, of Deland, is the MO for the Knights of the Kiloycles, and succeeds AYX who did a bang-up job. The Deland-Stetson Radio Club did a nice job at homecoming. PJI and 20Q1/4 set up a booth and cleared 124 messages. QSPers included HWA, PJU, and PZT. The new PJI rig with parallel 814s completely handswitching sounds of interest. Ft. Myers: CQZ reports PJE is at the U. of F. RHX moved to Tampa. WK to Key West, and FH to Homestead. Jacksonville: New JARS officials include GZJ, SHQ, HRB, NKG, and JWX. TFI has gone to Camp Gordon School and is succeeded by RNN at the Military District (AA4WAP). HWA handled plenty of stuff for our servicemen and their families. Bill QSPed through PZT, PJU, and Transcon for excellent service. Miami: WN4TRP now is minus the N. Bob made RCC and is building a 100-watt rig. SAT is building up his traffic. New Port Richey: Listen for WN4UOJ. KJ reports the following CDC licenses: KIA82 at Tarpon Springs, KIAA9 at Clearwater, and KIAAB3 at St. Pete. This news came via SEA and MJU. Congrats to Pinellas County CDC. Hal reminds all that MARS now is on 4020-kc. phone Wed. at 8 p.m. St. Petersburg: TZW is newly-licensed. TDK, the XYL of EYL, is on 14-Mc. c.w. and has 9 countries and 20 states. New St. Petersburg Club officers include TZW, PT, TLX, and HUY. EYL reports a CDC booth will be set up at the County Fair. Tampa: WN4TYE is running 35 watts with his 6L6 oscillator. Receiver is NC-173 plus a hand-rolled one. WN4TKD has 30 confirmed for WAS on the 3.7-Mc. band. He uses a hand-rolled 6C4/807 layout plus BC-224 for the incoming. West Palm Beach: CKB ran up 138,440 points in the SS. Novices in West Palm Beach are PB, TOP, UHB, GGD, and UGT. A new call there is UBJ. How about giving OMN and JGD a helping hand on the 3675-ke. traffic net? Traffic: W4PJU 885, PZT 275, HWA 142, KJ 122, LMT 117, SAT 100, WS 67, RWM 47, FWZ 27, NAK 13, IYT 6, IM 4, CKB 2.

WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — SEC: PQW. EC: PLE. PTF now has power to burn in his ear for the supermobile rig. TL seems to be going to high power with the 100THS. ACB still is QRL. e.d. RDC is working on u.h.f. gear. VR is having antenna-coupler trouble. TTM doesn't like being rock-bound on 28 Mc. UCY is rapidly becoming a DX man. RZV passed the Class A exam. RBC has slick mobile unit in the Ford. BKN pounds out FB signal on 75 meters. ROM is getting more and more power. BKQ has been heard on 14 Mc. SGG and PJT are active over Lyn Haven way. OKB is on 28 Mc. again. PQW is planning a pair of 250THs. HJA has been QRL. TV. AXP keeps 7 Mc. going. SZII has FB NC-125 receiver. PAA is working on electronic keyer again. MS is working on 70-c.m. TV rig. DMO was heard on 28 Mc. GIX gives 75 meters a whirl. BFD keeps a reliable signal on 14 Mc. with low power. NOX meets Gulf Coast Hurricane Net. We hear NX is getting into the middle of the section now. KYJ is active on 75 meters with an FB signal. MUX still keeps skeeds with PL. NYZ is fighting 807s. CQF gave RZV a final for his rig. GPH and ART are

(Continued on page 100)

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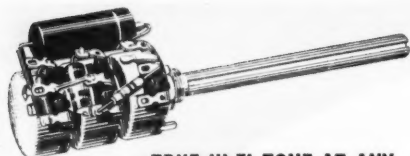
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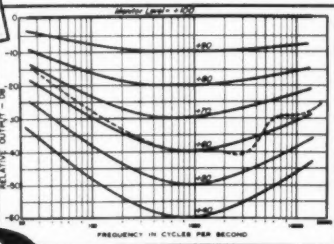
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on 7 Mc. LUF is going high power on 75 meters. Traffic: W4PQW 35, MS 2.

GEORGIA—SCM, James P. Born, jr., W4ZD—New officers of the Macon Radio Club are JMW, pres.; FFD, vice-pres.; KPC, secy.; LXE, treas.; NVS, act. mgr.; JMW, LXE, and BK, TVI committee. The Atlanta Radio Club elected the following: MZO, pres.; ZD, vice-pres.; NWK, treas.; EJC, secy.; NS, act. mgr. NS also is the new editor of the *Atlanta Ham*. The Camp Gordon Radio Club of Augusta was awarded a Public Service certificate for the handling of traffic in the July Kansas Flood Disaster. Congratulations to K4WAR, who has an FB traffic score again this month. POI has a new mobile installation in his new car. The Atlanta C.W. Net frequency has been changed to 7150 kc. Our RM, OSE, is forming a c.w. Novice net and requests Novice stations interested to send him a radiogram or drop him a card at Box 672, Gainesville. This will be a net for Novice stations only. KGP has a new single 813 final. CFJ has a new harmonic—a girl. ACH has a new 500-watt phone and c.w. rig. NS is building a 100-watt all-band TVI-proof transmitter. IAB now is stationed at Fort Bliss, Tex. UKY, UKW, and UGG are new hams in Atlanta. UKY is the only uninformed patroller with the City of Atlanta Police Dept. to hold a ham ticket. ADN has returned to Atlanta from Mississippi. EJK visited ACH during the Christmas holidays. GMP visited FBH after six months overseas. Traffic: K4WAR 4035, W4KGP 200, OSE 81, EJC 75, ZD 47, NS 39, POI 25, ACH 20, FVY 13, MTS 9.

WEST INDIES—SCM, William Werner, KP4DJ—SEC: ES, UW reports from Ohio. The report of DV, ORS, was received on the 3559-ke. Net. WP4PW now is KP, RA, a new ham, has TBS-50. MS moved 10-20 beam to 40-foot mast. DL was heard on 3.8 Mc. DV lived through an auto accident. DJ hears ZLs on 3.5 Mc. each morning. CB bought a house in Hato Rey. KF has a Vixen transmitter and VFO. MA and MO are back from the States for holidays. NJ reports into the 3925-ke. Net. Nets were operating on schedule through the holiday season but attendance dropped off. AZ has kw, and folded dipole on 3.8 Mc. Traffic: KP4OE 66, DV 14, DJ 5.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Samuel A. Greenlee, W6ESR—SEC: KSX, PAM; PIB, RMs; FYW, LDR. Section Traffic Nets: Mon. through Fri. C.w.: Southern California Net (SCN), 3650 kc, at 2030 PST. El Capitan Net (ECN), 3725 kc, at 1930 PST. "Phone" Northern Counties Net (ZOD), 3945 kc, at 1930 PST. BPL this month was made by W6KYV, CE, GYH, CMN, GEB, LDR, and BHG. Orchids to the L. A. YLRC gals (CEE, prexy) for bringing Santa Claus to those orphans in Yokosuka, Japan; to all the traffic men, phone and c.w., for their magnificent job handling that Christmas message avalanche; to FYW (RM) for his successful handling of ECN (restricted speed)—and that, brethren, is a job; to BHG for his c.w., phone, OBS, and traffic activities. AM secured his Extra Class ticket the first day issued. KYV finished 1951 with the hook 100 per cent clear of traffic. NCP watched his beams "take off like a helicopter" in our recent wind storm. KXS lost his antennas, too; he has new 48-ft. tower completed. HLZ is new "veep" of Mission Trail Net. PIB (PAM) is new prexy of American Legion Net. The Centinella Valley AREC threw its annual banquet with a Hawaiian orchestra and top-talent floor show arranged by OI (EC). GEB "breaks in" prospective hams by having them do his typing! New c.w. traffic man: IZO. Good, too. American Legion Net (3975 kc.) handled 557 messages in December. BHG's new sky-hook really is working. Val-Area AREC (VCU, EC) held a Christmas dinner-dance with all the trimmings. CE still says he is "taking it easy." WNs: NUJ is active on all WN bands. DX, too, and NIE made QSO No. 500 in December. LYG skeels several M/Ms. OO Dept.: CK nearly fell over when he received a card of acknowledgment and thanks from a ham to whom he had sent a friendly notice. Why is it that amateur courtesy seemingly does not apply to OOs? Look like the boys would rather get their warnings direct from FCC. Snap out of it, fellows; if the OOs quit, then we would really be in trouble. 1952 is BUK's 30th year under that call. GJP is on with a new rig and looking for c.w. traffic. What prominent traffic man is building a portable 75-meter phone rig? (Going to use your own call, Tim?) KGS read: some OH skeels while mobile (cute in automatic mode, no doubt). BLY reports: CEA now is prexy of Radio 50 Club. COZ reports a new Viking transmitter; CZP is erecting new sky-hooks for all bands; KPD has transmitter troubles and YMY is looking for 14-Mc. beam. (Did that blow away, too?) KSX reports for Long Beach that the emergency range (VNW, EC) has relay transmitter atop high hill, automatically rebroadcasting all net signals on alternate net frequency. The new Club station at RC Headquarters is the latest thing out. What well-known W6 in QSO while mobbing Christmas Eve casually mentioned his speed at 60 (in a 35-m.p.h. zone) and heard his words from a prowler call alongside? You guessed it, he got the ticket! KXS, SEC, extends his warmest thanks to all ECs, net members, and the ARRL staff for their cooperation. Have you seen

(Continued on page 102)



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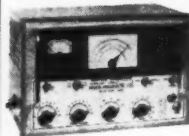
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FMG's mobile rig? 75-10 VFO. Top c.w. operator, too. FWH, who has been on active duty with the Navy, is due for release. Also reporting: BUK, CFL, CLX, COF, HOV, MJA, MU, PIB, PMS, QIW, WOO. Traffic: W6KYV 3988, EC 3749, GYH 1108, CMN 565, GEB 513, LDR 509, BHG 201, PMS 100, HIZ 88, FMG 75, LYG 68, NCP 62, CK 54, FYW 28, ESR 20, MJA 16, BLT 15, COZ 15, HOV 15, IZO 15, EBK 12, AM 8, QIW 7, WOO 6, W6NBU 5, W6COF 2.

ARIZONA — SCM, Jim Kennedy, W7MID — A new Novice call in Prescott is WN7QJV. At the VA Hospital near there is OPY, ex-9QIR and 9QIR, who has an 8-76 receiver and low-power c.w. rig. WN7QBJ, in Tucson, is interested in handling traffic and would like to hear from other Novices in the State with a similar interest. His QTH is Rt. 7, Box 63, Tucson. We got a nice clipping from PTY of Winslow, covering emergency work done by OJQ, IYS, KQV, and RU in furnishing emergency traffic facilities for the Santa Fe R.R. during a sleet and ice storm. Two new Novice calls in Phoenix are WN7QAQ and WN7PVE. A new mobile is OFE. Another new call in Phoenix is 2GRT/7, on 28 Mc. with 20 watts. PGA has a new beam, tower, and rotator. OZF, the West Phoenix High School station, got a large gift of ham equipment. OZF has a new tri-band converter, and is building a 250-watt home rig. OCB, in Scottsdale, has a new beam. OYC is on 28 Mc. with a 1625 final. OQF spends some time on 3.5-Mc. c.w. K7WAL, with 700 watts and a ground-plane antenna, is a new Phoenix call on 28 Mc. NAP has two new telephone poles to hold up his 75-meter antenna. LQB worked all districts in closing on 3.8 Mc. We had a pleasant visit with Norm, EC for Tucson, and were amazed at the activity for which he is largely responsible in the 10-meter emergency net there. To date, 73 different stations have checked into that net. Traffic: K7FAG 1034, W7BHI 162, JGZ 79, PKU 33.

SAN DIEGO — SCM, Mrs. Ellen White, W6YYM — Asst. SCMs: Shelley E. Trotter, 6BAM; Richard E. Huddleston, 6DLN; Thomas H. Wells, 6EWU. SEC: NBJ, RM: IZG, ECs: DEY and IOK. Up and coming with traffic handling is GTC. RM IZG reports that GTC has an FB fist, which any 7-Mc. operator can confirm. BVI finally is back on 75 meters. YHI and ZQZ are Advanced Class licensees in the Newport Beach Area. NSK is new ORS and is planning to go 40-meter mobile! IZG has a new 25-w.p.m. sticker on his Code Proficiency certificate. The Soledad Radio Club is starting Field Day plans with YYN as Field Day chairman. New YLs on the air are WN6HFF and WN6GJX. One of the old-timers in ham radio is back on the air in La Mesa running a kw. on 14- and 28-Mc. phone. He is K6BX, who has held the many calls of 4DJ, 4CZA, 7HGW, 6HLP, K6HLP, and originally W4CY in 1925. The San Diego TVI Committee is being organized under the able direction of KW. CRA now is operating with a General Class license. The Coronado Radio Club has a TVI Committee for its immediate area operating effectively. YSP, ham radio's gift to Channel 2, is back on 28 Mc. with 400 watts. EWI has been spending much of his time on a new 3-inch scope, which he got for Christmas. GDB, in short order, got his General Class ticket plus his 2nd-class telegraph and radar endorsement, and is working away at his aircraft endorsement when time from State College allows. News was slow because of the Christmas and New Year's holidays but is picking up with the start of another year. Traffic: W6IZG 354, ELQ 314, GTC 154.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, William A. Green, N5WBKI — Asst. SCM, Joe G. Buch, 5CDU. SEC: JQD, RMs: LSN and QHL. PAM: IWQ. KRZ was re-elected NCS for NTEN, with JOU as alternate. The AREC, under the guidance of JQD, had a full-dress rehearsal Jan. 2, 3, and 4 for the ice storms that visit this section annually. Crosbyton, McAdoo, and Floydada were out of commercial communications with the entire North Plains Area, experiencing much circuit delay. To remedy this situation the NWTE established a monitor watch on 3950 kc. with the following participating: AHX, ARK, AW, BFA, BEY, BKH, EEF, DCM, FQT, FNG, GZH, GBS, HBD, IBH, ILJ, IWQ, JUN, JQD, KYB, MDL, NAX, NXD, PAK, PWP, PXI, PTK, QJD, RRM, RYC, RGU, SOE, and SQW. Considerable traffic for Western Union was handled by FNG to Lubbock stations and also by SQW, of Abilene, who maintained nearly constant watch. JQD and RYC furnished a circuit for their State Representative to the Speaker of the House in Austin via NXD. All members of the Nortex/Okla. phone net have been issued certificates. If you were left out, contact IWQ. We have another family team composed of LUN and sons TFM and TXO. The Amarillo ARS held a social meeting with the XYLs and c.d. officials as guests. BFA has sold the BC-610 and will be on with a Viking. RRM also is using a Viking. Traffic: (Dec.) W5KRZ 246, PAK 221, GZU 210, SQW 184, QHI 169, ARK 167, IWQ 140, BKH 134, JOG 141, RRM 93, RHP 82, LEZ 67, BFA 61, MTD 45, AWT 41, HBD 37, RJM 36, PKB 35, IGU 27, SGR 26, QIF 12, SHQ 12, RHC 10. (Nov.) W5LEZ 20.

OKLAHOMA — SCM, Frank Fisher, W5AHT/AST — (Continued on page 104)



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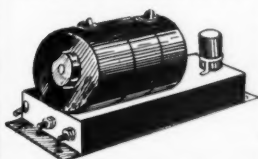
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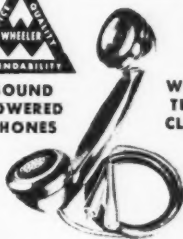
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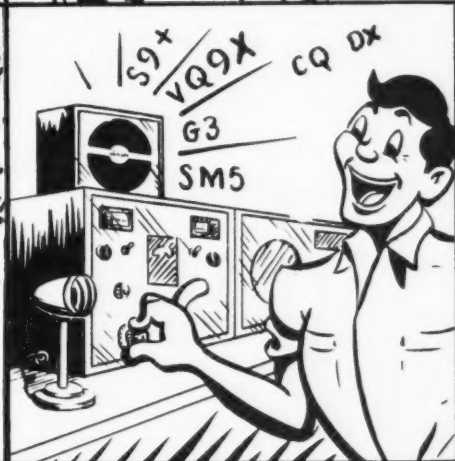
242 EAST 137TH ST., NEW YORK 51, N. Y.

Acting SCM, J. M. Langford, W5GVV, SEC: AGM, RM: OQD, PAMs: GZK and ATJ. Because of unexpected developments in my business I am forced to curtail amateur radio activities quite severely and in order that activities of the Oklahoma section may not be adversely affected by my inactivity, I am resigning as your SCM. XYL will assume SCM duties and responsibilities until my successor is elected. My sincere thanks to all the gang who have given such wonderful cooperation in making our section really representative of the League and what it stands for. Keep up the good work, fellows, and I hope that I can be of service to you again some day. 73. — FE. Good luck to you, FE, in the new venture. W5UGD, RIT, XYL, now is active in Lawton. GZK burned the midnight oil for a total of 500 origins. PA has accepted membership of OPEN and will coordinate it with the River Forest Net. The SEC, with the able assistance of EHC, in cooperation with the Oklahoma Office of Civil Defense, prepared a drill for all ECs with 19 countries registered. Ten counties reported messages delivered within 4 minutes after receipt. All counties delivered within 10 minutes. The Enid Amateur Radio Club had its annual Christmas dinner Dec. 30th, with 21 attending from Canton, Sulphur, Oklahoma City, Ponca City, Blackwell, Medford, Wichita, Tulsa, and Burlington, for a total attendance of 54. NVO, Bartlesville, is just getting started in traffic work and is working into OILZ Traffic. (Dec.) W5GZK 1023, MRS 671, OQD 401, SWJ 145, FOM 125, RIT 104, MQI 91, GVV 68, ROZ 41, JHA 42, MFX 34, FRB 32, EHC 30, WQ 26, NVO 25, NAY 22, OFG 20, CKQ 18, AHT 17, BAR 6, W5UGD 4. (Nov.) W5HFN 17.

SOUTHERN TEXAS — SCM, Dr. Charles Fergaghie, W5FJP — DSB and his XYL are getting a new receiver. QOQ, W5STFW, JBW, and MKP are very active on v.h.f. QUE now is Advanced Class. STP will be back on 28 and 144 Mc. soon. PCC moved back to West Texas. AQE reports progress in emergency preparation. The club is obtaining emergency power and storage space for emergency equipment. NHB has a new Panadapter and is active on H.F.N. and C.E.R.N. JNM is on 75 meters. W5STFP is developing a new flat on 80-meter c.w. KFY is constructing a new Wallman converter for 144 Mc. W5TYI is on 3.7 Mc. IQQ has four-element 20-meter rotary and full gallon. EIV and NXP are planning on 2 meters. W5UJJB is a new member of AREC. ACL has been making repairs on his antenna. AEQ is on 75 meters with 606. KZI is teaching school and hamming week ends with 150 watts to a T-40. NIH is mobile with 40 watts to 696, 700 watts to p.p. 813 on 75 meters. NIG has 120 watts to T2-40 on 40-meter c.w. MAW is working 75 p.p. 813, 700 watts on all bands except 160 meters. FXN worked VP1RF, EK1AR, and VP8AP on 14-Mc. c.w. to bring his total to 143 worked and 129 confirmed. GJF is Advanced Class and is on 75 meters. NXP is planning 813 to replace 814. W5TYI has Collins 75A-1. EIV is planning to use ARC-4 on 144 Mc. OUG is on 3.5, 7, 14, and 28 Mc. with 200 watts, pair of 3D23s. ADZ worked MP4KAE and OY3IGO to make 202 countries. FJF is active on 14-Mc. "phone, 7-Mc. c.w., and 3.8-Mc. mobile. 4RZU now is in San Antonio. RHH reports 7 Mc. is rough. RSJ has a new Federal 1-kw. rig on c.w. and a new Advanced Class ticket. RPW has a new 813 transmitter on all bands. RWS is doing lots of ragchewing on 28 Mc. with a four-element extra-wide-spaced beam "bazooka matched." MDZ is on 75 meters with flea power with a new Class A license. FWC is on most bands with 250 watts to p.p. 812. LI has a 10-meter exciter and rotary amplifier. SDA has new Class A license and needs more "phone-patch traffic. EEX is working on a new mobile. QOF is doing well on 7-Mc. c.w. with 50 watts and working VKs. TGE is putting out a swell signal on 7 Mc. UIN is on 28-Mc. "phone with low power, 25 watts to 832A, SAEN, under PY, works on 28 Mc. and includes BG6E, EJT, FNG, GIP, GTZ, KLV, KTL, LFG, LVE, MF, OST, PY, QCB, QC'H, QDB, RAL, RNX, RRS, RSD, RT, SAH, SEM, SOL, SUX, TAU, THU, UB, USA, KS, FAC, KFK, and FSS. RAL and RT have been appointed AECs. Traffic: W5PTV 1332, MN 1156, RTT 292, PTR 221, QFA 220, QDX 205, RIII 113, QEM 100, 4RZV 5 68, IZB 65, FXN 4, NXP 1.

NEW MEXICO — SCM, Robert W. Freyman, W5NXXE — SEC, PLK, RAL, NRG, PAM, BW, VLF, PAM. FAG, A State picnic will be held this spring and a State hamfest this fall with the Sandia Base Radio Club serving as hosts. MSG came through again in the November FMT with 4 measurements averaging 17.4 p.p.m. CVI has an 813 on 3.8-Mc. "phone. NSN is back on 3.8 Mc. with 300 watts to 707BX, ETM, RME, and SPM are new members of AREC. 6EHA and 6EHB, another OM/XYL team, have moved to Las Cruces. They hold OBS appointments, are AREC members, and are active on 28-Mc. mobile. RMK has new multi-band 813 "phone rig. WVC is active in 3.5-Mc. c.w. net with 300 watts from Sandia Park. AKR is running 9 watts on 7042! NSN's fancy traffic total of 426 was made on 7 Mc. only. KEN has 450 watts on 7.7 on 3.8-Mc. "phone. SMA is moving permanently to Oahu. FAG has moved to Albuquerque to go into the radio-TV business with LYQ. QDD is working on TT and hopes to be out of the Army in August. RCJ has new jr. operator. The Santa Fe and Los Alamos Clubs held a joint meeting

(Continued on page 102)



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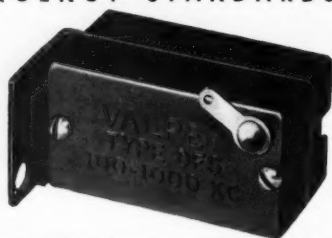
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CANADA MARITIME DIVISION

MARITIME—SCM, A. M. Crowell, VE1DQ—SEC: FQ RM, OM, EC, EK. It is our sad duty to record the passing of an old-timer, Cecil Landry, ex-10-AR and C-10-AR. The HARC's new officers are RP, pres.; HD, vice-pres.; and WL, secy-treas. FQ continues to head the traffic list. ET lost his 28-Mc. beam in a heavy gale and retrieved the bits for a band opening. Walt is back on 3.8-Mc. 'phone. HI has returned to 14-, 3.5-, and 1.9-Mc. c.w. Both Ralph and EA have been going after some DX on the 1.9-Mc. band. BH has been giving the old 14-Mc. 'phone rig a whirl. OM finds time between the M.T.N. and E.T.N. to work in a bit of 'phone on 14 Mc. NN, a new 'phone on 14 Mc., is the Naval Radio School Club call at H.M.C.S. Stad. LF has been on 14 Mc. HC, BC, ME, PT, MK, MA, and YV have been active in A.F.A.R.S. QW has been heard on 14 Mc. and is going after D. QY, QZ, and BC have been taking advantage of the openings on 50 Mc. The Halifax gang is watching for JASRG, ex-1UC, now on Kure, Japan. MZ is on from W9LRU, Chicago, near 14.2 Mc. YV has been very active all month handling emergency traffic between Cape North and North Sydney in connection with a missing aircraft in Labrador. AAL is back on the air on 75-meter 'phone after being off for many months while his Harvey-Wells TX was being repaired. ABR is a newly-licensed station in North Sydney and works 3.5-Mc. c.w. CR is busy constructing a super 50-Mc. TX. WE is back from Newfoundland and on 3.5-Mc. c.w. HC had a recent contact on 50 Mc. with W8CMB. Traffic: VE1YV 227, FQ 183, MK 127, AAK 62, OM 41, HT 37, ABJ 32, DQ 20, XH 20, AL 19, PO 15, DB 8.

ONTARIO DIVISION

ONTARIO—SCM, G. Eric Farquhar, VE3IA—GI struggles with 6-meter receiver. DQZ visited Florida and kept in touch with home through AJR, BVR, IA, WE, and W4E. BV enjoyed traffic from home via IA while on a trip to New York City. VD has a new Zepp. WY starts his fortieth year in radio this year. EAO is on 28 Mc. but in a short while accounts for 16 countries. EAP bends and repairs needle of meter in grid-dippers! A very successful tower-raising bee was held at EAB's location. BGQ, BHS, DNO, ABP, and BV are heard on 7 Mc. The Frontier Radio Assn. of Windsor enjoyed the showing of ARRL TVI

ONTARIO SECTION QSO CONTEST

A QSO Contest, open to all Ontario Section amateurs, sponsored by the Ontario 'Phone Club, will be held on two consecutive Sundays, March 16th and 23rd, 1952, from 10 A.M. to 10 P.M. each period. The purpose of the Contest is to enable c.w. and 'phone operators to become more familiar with both types of operating. Two awards will be made. The c.w. award will be known as the "Sparton Radio Trophy" and the 'phone award as the "Columbia Record Trophy." Both trophies, donated by Sparton of Canada, will be suitably engraved with the winner's call and the year of presentation. Permanent possession of the trophy will be given to the person winning it on three occasions. Following are the rules: Frequencies from 3500 kc. to 3725 kc. will be allotted for c.w. operation, 3500 kc. to 3800 kc. for c.w. to 'phone operation, 3725 kc. to 3800 kc. for 'phone to 'phone operation, 3765 kc. is allotted to mobile 'phone stations. No multipliers will be used and one point for contact from 'phone to 'phone, 'phone to c.w. and vice versa, provided contacts are made in the portion of the band above designated. Any station may operate 'phone or c.w., provided his operation takes place in the proper portion of the band. Judges of the contest will be: C.w.—VE3HP, 'Phone—VE3FQ and VE3YJ. Contest logs should be sent to E. Kimble, % Sparton of Canada, Limited, London, Ontario, up to midnight March 31, 1952.

films and appreciates the efforts of BUR in obtaining and returning same to Headquarters. OJ looks for 50-Mc. contacts. Holders of ARRL appointments are requested to check the date of expiration and forward certificates for renewal. With deep regret we record the sudden passing of Al Whitham, BNQ, while on a business trip. His familiar voice and cheerful disposition certainly will be missed by amateurs the world over. He was very active on 28 and 14

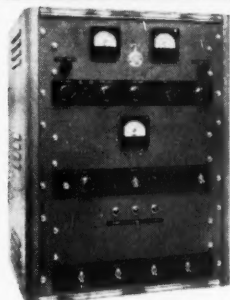
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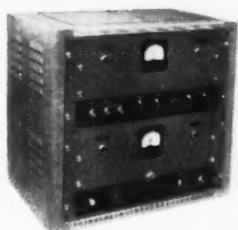
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1. Experience and training.

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- c. Amount of this experience in telegraphy and amount in construction or maintenance.
- d. Present radiotelegraph code speed.
- e. Present or past radio licenses, including amateur.

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If your initial application appears promising, you will be sent full application forms upon which detailed information can be entered.

Mc. Al was licensed in 1947 and became the first amateur in Hamilton to belong to the DX Century Club. He was a member of the Air Force Amateur Radio Society, holding the call CHR89 in No. 4 Area. He held WAC, WAS, and WAVE certificates. Greatly interested in his radio club, of which he was a past vice-president, he did much work in editing the monthly bulletin of the HARC. Immensely interested in all phases of emergency work he never missed a Field Day. As an Emergency Coordinator he did much work with his mobile rig and by name of operating became a pattern for newcomers to copy. Traffic: (Dec.) VE3IA 238, ATR 182, BUR 170, WY 151, IL 128, AHO 102, EAM 101, AER 81, BER 80, AYW 70, BMG 63, YJ 43, GI 39, DGZ 28, KM 21, PH 19, SG 18, VD 15, VJ 6, OJ 2, AVS 1. (Nov.) VE3BMG 69, AER 66.

QUEBEC DIVISION

QUEBEC—SCM, Gordon A. Lynn, VE2GL—It is with regret that we record the passing of George Alec Awcock, VE2AA, suddenly on Dec. 22nd. LO reports continued activity in PQN and TRN. AO reports considerable traffic handling. AKJ too active in PQN and TRN. AB participated in the Frequency Measuring Contest, 26-27. AAO has been appointed Official Observer. Call him for frequency checks. CA reports the bugs are all out of his new 833-A rig and it is working very smoothly. Phyllis, his XYL, was very busy with traffic in November and also arranged a wedding for one of the boys coming out of the North Country on the CGS N. LeDain, the young lady having visited her twice talking to the boy friend and completing arrangements. XR is on again from new QTH in Dorval, NM, back from the north where he was VE8RD, now is on his way to Goose Bay. TH is on from Mecatina, half way between Seven Islands and Goose Bay on 75 and 20 meters. GN has changed QTH from Montreal to Quebec City. MO is back in St. Lambert and eyeing the situation as regards a sky wire, after completing an engineering course and obtaining his degree. The annual New Year's International QSO Party was held Jan. 4th on 3960 kc. with a number of VE2s participating, and with WISEJ as master of ceremonies. A number of Lake Shore hams set up a station in Ste. Anne's Military Hospital the Saturday preceding Christmas and handled a large volume of greeting messages, using BP's rig and call, with IS assisting from his home QTH. Traffic: (Dec.) VE2BB 147, SD 106, CA 83, AO 54, LO 27, AKJ 22, AMB 21. (Nov.) VE2CA 70.

VANALTA DIVISION


ALBERTA—SCM, Sydney T. Jones, VE6MJ—LQ still skeds VE2AOJ and reports fairly consistent results. HM is doing a land-office business in relaying traffic for the boys in the North Country. YM has a new 150-watt rig about completed. EA has overhauled the mobile rig. UP puts out a real good signal on 3.8-Mc. phone. VK has a new rig under construction with high power in mind. EG now has crystal on Alberta Phone Net frequency. LZ and LQ achieved good results in the November Frequency Measuring Test. KS has rebuilt his rig and is heard on 3.5-Mc. c.w. with a real good signal. GA has turned in some good reports to RF, the official amateur paper in VE6-Land. II has new power plant and hopes to have a new long-wire antenna soon. OC rebuilt the antenna tuner and the results are noticeable. Congratulations to EO on reaching the old-timer stage. MA is reported to have run up a nice score in the recent SS Contest. As my term as your SCM expires May 1st I wish to express my appreciation for your loyal support during the past four years. I am again offering my services for another term and your continued support would be appreciated. Traffic: VE6HM 123, OD 92, MJ 49, YM 29, JJ 24, OC 12, NB 6.

BRITISH COLUMBIA—SCM, Wilf Moorhouse, VE7US—The BCARA held its "Open-Forum" '51 meeting in Red Cross Headquarters under the auspices of VARC. The 5 O'Clock Net QSYs to 3797 kc. for future operations. The 3755-kc. frequency is ARBC and "contact frequency" in B. C. The SEC is busy with AREC activity, Red Cross, and c.d. Both groups have amateur participation in their books, also RCMP have listings on hand. Mobiles AKD, FB, US, BQ, AP, ACI, UW, DD, GR, and others are listed with DD, the SEC. The VE5 amateurs are mentioned in CD Bulletins for tests held. AYL still is in Victoria. New hams steadily are being listed. AC is building 80-meter rig. AOU now is Class B. QC is doing an excellent job as Regional EC. AOB, TT, and AC reported. DH, in Nanaimo, also is active. SO, AEP, AQQ, VE, RS, LM, PP, TN, and CW are not heard from very often. ALL has been busy shovelling snow. PZ is on 75 meters. ECs: AOB, QC, ALL, AIO, DH, PZ, PO, FG, and LF. OAs: UT, DH, JM, AOB, BQ, AMI, TT, and QC. ORS: AC, TF, and SW. ORS: KC, LK, AC, HJ, and TT. RM: KA, SE: DD, ASA is building her own rig. US has increased power. DH reports on VI for AQB, GP, SH, ACC, AHF, PN, and LP/7. To AKG: Congratulations on the twin boys. QRM intranets will only improve if nets operate on their respective frequencies. In B. C. these are 3753, 3780, and 3797 kc. If all other SCMs please note: VE7s will try to watch other net

(Continued on page 110)

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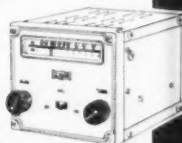
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factor plastic core; moisture
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**10
for
\$2.00**

(On mail orders add 20c
for postage and insur.)

ARROW ELECTRONICS, INC
82 CORTLANDT ST., NEW YORK 7, N. Y., DIGBY 9-471

frequencies so as to warrant reciprocal consideration from
VE6s, 5s and 4s. Traffic: (Dec.) VE7QC 77, US 10, AOB 4,
TT 3. (Nov.) VE7QC 59, DH 11, AOB 8, DD 6.

PRAIRIE DIVISION

MANITOBA—SCM, A. W. Morley, VE4AM—Con-
grats to RO on receipt of his A-1 Operator award.
EX-400 now is signing JA3KG and is looking for Winnipeg
contacts on 14-Mc. c.w. BV is testing TBS-50 on 75-meter
phone and GS has n.f.m. rig going on the same band.
From Brandon comes word that 5CW now is located there
and will have a VE4 call soon. 6EH was a visitor there.
In Dauphin, XP and PA are both up after a sick spell. LC
has antenna up for 80 meters and hopes to be on soon.
HP completed two months' struggle with Class B motor
and now has 150 watts to 81s on 75 meters. JQ is QRL.
YLtis, JL has a book shelf in every room and spends con-
siderable time reading. Because of 1952 being Leap Year
the dates of the Dauphin Hamfest got mixed up. It definitely
is scheduled for August 31st. Hope to see you there. Traffic:
VE4AM 128, HG 84, GV 40, DQ 35, HT 22, QD 20, CE 16,
HV 14, CI 11, F 8, BD 8, AL 6, GB 2, JM 2.

SASKATCHEWAN—SCM, Harold R. Horn, VE5HR
—Reports reached a new low this month, possibly because
of the Christmas and New Year's activities. Let's have
more reports, please. BV is new ORS appointee and also is
a member of the newly-organized Maple Leaf Net (MLN)
operating Trans-Canada on 7290 kc. Archie's first traffic
count shows plenty of activity on the Net. PA has moved
to 75 from 20 meters where he says activity is greater. HR
received his African QSL card for Christmas and has sent
in for WAC. If you wait long enough you eventually get
the much-needed ones. FY reports AFARS on 4290 kc.
doing fine. New members are WT, IW, GI, TR, GO, BZ,
MK, MQ, FR, PR, and DJ. That's it for this time, gang,
so let's know what you are doing so they can show it.
Traffic: VESBV 137, HR 103, TE 95, YF 38.



His rig's for sale. His beam is down.
There are holes burned through his socks.
McGoof had just one weakness—
He trusted interlocks.

Strays

Amateurs interested in servomechanisms—
control devices which are elaborately combined
in complex electronic "brains"—may obtain
a treatise on this subject prepared by two authori-
ties in the field, William J. Dechake and Albert
C. Ball. This "serviceman's primer" on servo
systems, 265 pages which include diagrams,
tables, photographs and graphs, is available for
\$2.00. Orders should be addressed to the Office
of Technical Services, U. S. Department of Com-
merce, Washington 25, D. C., accompanied by
check or money order payable to the Treasurer
of the United States.

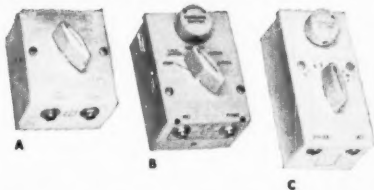
Answer to QUIST QUIZ on page 10

A can move to another band, but the smart thing
to do is to find out what is at fault and correct it.
B's rig may develop spurious signals and key clicks
when he goes to high power, but it is not at all to
be overlooked. C's signal is distorted. D's signal
is the strongest. E's rig is a good one. F's rig is a
good one. G's rig is a good one. H's rig is a
good one. I's rig is a good one. J's rig is a
good one. K's rig is a good one. L's rig is a
good one. M's rig is a good one. N's rig is a
good one. O's rig is a good one. P's rig is a
good one. Q's rig is a good one. R's rig is a
good one. S's rig is a good one. T's rig is a
good one. U's rig is a good one. V's rig is a
good one. W's rig is a good one. X's rig is a
good one. Y's rig is a good one. Z's rig is a
good one.

LOOK STEINBERGS LOOK

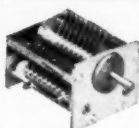
SUPER SPECIALS

JACK BOXES



- (A) BC-345, 3 1/2" x 3" x 1 1/4" aluminum, 2 standard open-circuit jacks, 3-position switch, 6-contact banana plugs and jacks.
 (B) BC-1366, 4 1/4" x 3" x 2 1/4" aluminum, 1 standard open-circuit jack, 1 3-circuit mike jack, 150,000 ohm volume control, 5-position switch, 11-contact banana plugs and jacks.
 (C) BC-213, 5 1/4" x 2 3/4" x 2 1/4" aluminum, 1 standard open-circuit jack, 1 3-circuit mike jack, 150,000 ohm volume control, 4-position switch, 8-contact banana plugs and jacks.

YOUR CHOICE 30¢



CONDENSER SPECIAL

75 mmf, 4250 peak voltage, ceramic button insulation, adjustable spacing, straight-line capacity, precision construction, 3 1/4" long, 1 3/4" wide, shaft 1/4" x 1", adjustable tension, double-bearing. **89¢**

8/8/8 MFD. 500 V. D.C.

Triple 8 mfd, 500 working volt D.C. oil-filled condenser, common negative, solder terminals, hermetically sealed, 5" 3 3/4" x 2 1/4". A one-time buy... **\$1.95**

GRID BIAS CONTROL



2500 ohm, 25 watt Clarostat potentiometer, perfect grid bias control for panel mounting, excellent heavy-duty P.A. speaker volume control, TV focus control, worth \$5.20 list, brand new... **69¢**

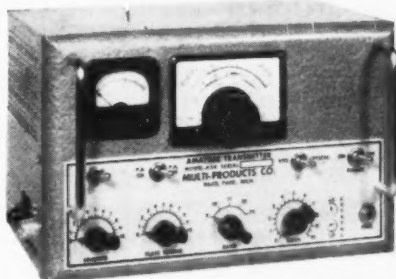
PHOSPHOR BRONZE AERIAL



125 ft. of the finest aerial wire obtainable. 42-strand phosphor-bronze with linen center. Will not stretch, very high tensile strength, diameter approximately same as No. 14 copper, very flexible. Excellent for transmitting or receiving antenna, control cable, guy wire. Regular list \$4.95... **90¢**

MINIMUM ORDER \$2.00.
Send 20% deposit with COD orders. Please include sufficient postage or instruct us to ship by Express Collect. Overpayment will be refunded by check.

ELMAC-A54 Under-dash Mobile Xmtr.



VFO or Crystal control. Direct-reading. VFO on all bands—75, 20, 11, 10. • Plate modulation • Completely band-switching, fone or CW. • 50 Watts max. input. Power required: 300-500 V.D.C. at 250 ma., 6.3 V AC or DC at 4.5A. • Uses 3-6AG5, 6AR5, 6C4, 12AU7, 2-6L6G, 807, (included). • Only 7 1/2" x 7 1/2" x 12", 14 1/2 lbs.
 For carbon mike input... **\$139.00**
 For Dynamic or crystal mike... **\$149.00**
 Power Supply, 110 Volt AC... **\$39.50**
 ELECTRO-VOICE 210 Mobile Carbon Mike... **\$16.50**
 ELECTRO-VOICE 600D Mobile Dynamic Mike... **\$23.10**

MORROW 3-BAND CONVERTER

- No Images or Birdies
- Automatic Noise Limiter—Built In
- 1-Microvolt Sensitivity—All Bands
- Antenna Trimmer on Front Panel
- Beautiful Grey Hammettone Finish
- Drift-free, Pre-calibrated Oscillator
- Full Width Dial—Calibration Accuracy 1%
- AVC On Preset, No Strong Signal Blocking
- I.F. Amp. with 4 Tuned Circuits, Output 1525 Kc.
- Complete with Mounting Hardware, Manual
- Case—Height 4", Width 5 1/2", Length 6 1/2"



\$64.95

- Hi-Q. 20 coil to base load 96" whip... **\$8.95**
 Hi-Q. 75 coil to base load 96" whip... **\$7.95**

MASTER MOBILE UNITS

- All-band center-loaded antenna for 75-20-10, specify coil wanted, less mount... **\$8.75**
 100-96S. Stainless Steel 96" threaded whip... **\$5.25**
 9-96T. Silicon-Chrome 96" threaded whip... **\$3.75**
 100-60S-60". "All-Band" top section only... **\$4.95**
 132. Tapered spring universal body mount... **\$8.75**
 132X. Heavy-duty universal body mount... **\$9.55**
 132J. Junior model universal body mount... **\$4.17**
 140. Tapered spring bumper mount... **\$6.55**
 140X. Heavy-duty bumper mount... **\$7.65**
 140J. Junior model bumper mount... **\$4.17**



Steinbergs

633 WALNUT STREET • CINCINNATI 2, OHIO

Your order will receive my personal attention and will be shipped the same day order is received. We distribute all top-flight amateur lines... let us know what you need.
 73, Jule Burnett, W8WHE

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Unusual opportunities for outstanding and experienced men

These top positions involve preliminary and production design in advanced military aircraft and special weapons, including guided missiles.

IMMEDIATE POSITIONS INCLUDE:

- Electronic project engineers
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Excellent location in Southern California. Generous allowance for travel expenses. Write today for complete information on these essential, long-term positions. Please include resume of your experience and training. Address inquiry to Director of Engineering.

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CODESPEED** *without strain*

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Get skill, accuracy, speed with the highly endorsed Candler System. Learn to send and receive by telegraph or radio code. Government service and commerce need thousands of better trained operators. Air commerce, mail, freight, etc., demand expert, reliable operators. Good pay. Get the Candler System, the maker of champions. It teaches you the "knack" of sound sense, alertness, speedy sending and receiving without strain. Adventure—good pay. Learn at home or wherever you are. Rush name today for free book.

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Model D-11

- 955 OSC.
- 3.4 to 170 Mgs. as Dip Meter
- 3.4 to 340 Mgs. as Signal Generator
- 5 Plug-in Coils
- Phone Monitor



CW Monitor

- Harmonic Indicator
- Absorption Wavemeter
- Measures Tuned Circuits, Antennas, etc.
- Complete ready to operate
- \$39.95 Net**

Write for Literature and name of Dealer nearest you stocking Lysco Ham Equipment

LYSCO

HOBOKEN, N. J.

Twenty Watts Mobile

(Continued from page 23)

Power Supply

Since an inexpensive dynamotor with sufficient power capacity could not be found, two vibrator supplies having an output of 100 ma. at 300 volts were obtained at a reasonable figure. This supply, with a conventional brute-force filter, works very nicely, since one unit is used for the r.f. section, while the other supplies the audio stages. The latter supply is set at 250 volts output because this is the maximum recommended manufacturer's rating for the 2E30 tubes. The use of two supplies provides better regulation, because the current variation of the Class AB₂ modulator is not reflected on the supply voltage for the r.f. stages. The two power units are housed in a 6 × 6½ × 9½-inch metal box mounted under the car hood.

Results from this installation have been most satisfactory on all bands, and it is hoped that others will find some of the features worth adopting.

Letters from TV Manufacturers

(Continued from page 27)

peculiar arrangement, we felt the fault was ours and spent considerable money correcting these receivers so that the interference problem was eliminated.

I can assure you that you will find our organization most cooperative toward solving any such problems, should they continue to arise.

We are well aware of the steps that are being taken by other manufacturers to incorporate adequate selectivity in their v.h.f. and u.h.f. receivers. We naturally will continue to develop our front-end circuits so as to be as good as, if not better than, our competition. We appreciate your offer to perform cooperative tests on our receivers and should the occasion arise where we feel it is necessary, we will certainly take advantage of your kind offer.

— E. B. Passow,
Product Manager, Television Division

HALLICRAFTERS

... We are currently producing and engineering high-frequency transmitters as well as TV receivers and communications sets and are therefore very close to the problem of interference concerning both receivers and transmitters. All 1951 and subsequent Hallcrafters TV receivers employed tuners with tuned antenna input circuits, and the majority of the same production has in addition i.f. filters at the antenna. All 1952 receivers have i.f. filters at the antenna. In certain rare cases high-pass filters may be required in addition. When this is certified by the local TVI committee, arrangements are now in process so that the cost of the filters and labor will be accomplished at no charge to the TV set owner or the local amateur. We are forwarding current production TV sets for your test purposes and it would be a privilege to have our engineers come to Hartford for consultation. You may recall that during the FCC Bridgeport test we made available our u.h.f. receivers and converters for TVI testing with your engineers. Please depend on us for hearty cooperation at all times in this important problem.

— Harold Adler,
Director of Engineering

EMERSON

I received your letter . . . together with enclosures, and have submitted same to our Engineering Department for their attention and information.

— Benjamin Abrams, President

(Continued on page 114)



Our 29th Year
QUALITY - PRICE
DEPENDABILITY

SPECIALS

Rack panel cabinet - 8 3/4" panel space	\$11.00
Double Vee antennas	3.88
Stacked dubl vee with Q bar	8.71
100 ft. coil, 300 ohm lead	2.19
RG/59U coax cable, 72 ohm, per ft.	.06
#14 enamel, 100 ft. coil	.95
#12 enamel, 100 ft. coil	1.25
#10 enamel, 100 ft. coil	2.45
1/25W. neons with leads	.08
2 1/2 W. argons	10 for 1.50
Pilot assemblies with dimmer	.19

Sarkes Tarzian Center Cooled Power Rectifiers. Full Wave Bridge Type. Maximum input 52V. AC—output 20-40V. DC.

D24.....2 amp.....	\$ 9.90
D25.....4 amp.....	13.67
D26.....6 amp.....	14.36
D27.....8 amp.....	17.83
D28.....12 amp.....	18.67
D29.....15 amp.....	32.14
D30.....22.5 amp.....	33.61

Write for circular on other stacks and on Half Wave 115V. Stacks

DC to AC Converter. 6V DC-110V AC-60 cycles 40-45 watts. Will fit into cigar lighter of any car to supply power for portable radios, phonographs, electric shavers, fluorescent lites... 9.95

ALUMINUM CHASSIS

7x 9x2	\$1.03
7x11x2	1.06
7x13x2	1.20
10x14x3	1.97
7x15x3	1.76
7x17x3	1.91
8x17x3	2.03
10x17x2	1.91
10x17x3	2.20
11x17x3	2.29
12x17x3	2.67
13x17x3	2.82

STEEL CASES

Black Crackle Finish

4x4x2	\$.70
4x5x3 .....	.80
6x6x6	1.10
12x7x6	2.13
15x9x7	2.88

AMPLIFIER FOUNDATION CHASSIS

With 6" High Louvred Cover	
5x10x3	\$2.48
6x14x3	2.75
10x12x3	3.45
10x17x3	4.13

EICO KITS

145K	Signal Tracer	\$19.95
221K	V.T.V.M.	25.95
315K	Signal Generator (De luxe)	39.95
320K	Signal Generator	19.95
322K	Signal Generator	23.95
360K	Sweep Generator	34.95
400CK	Conversion Kit (Push-Pull 5" Scope)	8.95
425K	5" P.P. Scope	44.95
511K	Multitester	14.95
526K	1000 ohm per volt Multimeter	13.90
555K	20,000 ohm per volt Multimeter	29.95
625K	Tube tester	34.95
950K	Resistance Capacitance (Bridge & R.C.L. Comp.)	19.95
1040K	Battery eliminator & charger	25.95
1171K	Resistance decade	19.95
P75	RF Probe (Xtal type) for VTVM	5.95
P76	RF Probe (Scope)	5.95
HVP-1	Hi-Voltage probe	6.95

Write for circular on wired instruments.

MODULATION TRANSFORMERS

Type No.	Output Tubes	Ohms Impedance		Max. M.A.		Watts	Dimensions			Price
		Pri.	Sec.	Pri.	Sec.		H.	W.	D	
A-3008	PP6AQ5, 6V6, 6F6. Single 6A6, 6N7, 53	10000 c.t.	4000-5000 7500-10000 12000	70	60	10	2 3/4	2 3/4	2 3/4	\$2.12
A-3109	PP2A3, 6A3, 6B4, 6L6, 45, 46, 59	6000 c.t. 3800 c.t. 3000 c.t.	5000-8000 10000	80	100	25	3 1/4	2 3/4	2 3/4	5.00
A-3110	PP6L6, 807, RK41, HY56, HY61, HK24	6600-3800 c.t.	4000-5000 7500-10000 12000	175	150	60	4 1/4	3 1/4	3 3/4	8.53
A-3113	PP-800, 809, TZ-40, T-55, HK-54, RK-31, HY-40, 811, 807, 812	15000-6900 c.t.	3000-4000 5000-6000	250	300	175	4 3/4	3 1/4	5 1/4	12.94

UNIVERSAL MODULATION TRANSFORMERS

Tapped Series-Parallel Coils Provide a Wide Range of Modulation Ratios

Type No.	Pri. Impedance	Pri. M.A. Per Side	Sec. Impedance	Max. Sec. M.A.±	Watts	Dimensions			Price
						H.	W.	D	
A-3104	2000-20000	50	2000-20000	50/100	15	3 3/4	2 3/4	2 3/4	\$6.32
A-3105	2000-20000	150	2000-20000	150/300	60	3 3/4	3 1/4	4 1/4	9.41
A-3106	2000-20000	220	2000-20000	220/440	125	4 3/4	3 1/4	4 1/4	13.23

POLYSTYRENE ROD AND TUBING

TUBING 12" LENGTHS			
O.D.	I.D.	WALL	PRICE
1/4	1/8	.062	\$.07
5/16	3/16	.062	.10
3/8	1/4	.062	.13
1/2	3/8	.062	.18
5/8	1/2	.062	.23
3/4	5/8	.062	.29
1	7/8	.062	.38
1 1/2	1 1/4	.125	1.13
2	1 3/4	.125	1.50

Both Rod and Tubing also available in 48" lengths to order.

ROD 12" LENGTHS

O.D.	Price	O.D.	Price
1/8	\$.03	3/4	\$.80
3/16	.06	7/8	1.15
1/4	.10	1	1.55
5/16	.16	1 1/4	2.30
3/8	.21	1 1/2	3.30
1/2	.40	1 3/4	4.50
5/8	.57	2	5.90

If not rated 25% with order, balance C.O.D. All prices F.O.B. our warehouse New York. No order under \$2.00. We ship to any part of the globe.

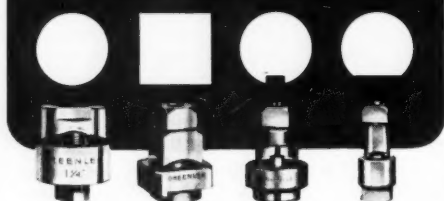
LEEDS RADIO CO.

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Cortlandt 7-3440

Dept. QS 3
New York City 7

ROUND, SQUARE, KEY and "D" OPENINGS QUICKLY MADE

with Greenlee Radio Chassis Punches



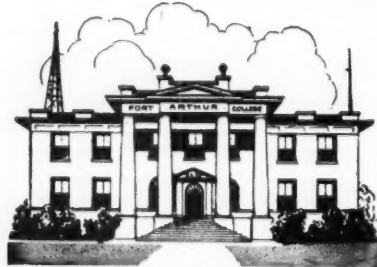
Save hours of hard, tedious work . . . cut accurate holes in chassis for sockets, plugs, controls, meters, panel lights, etc. with GREENLEE Punches. In 1-1/2 minutes or less make a smooth hole in metal, bakelite or hard rubber up to 1/16" thick. Easy to operate. Simply turn with ordinary wrench. Wide range of sizes. Write for details. Greenlee Tool Co., 1863 Columbia Ave., Rockford, Ill.



WANTED . . .

Experienced amateur for office correspondence. Also, a man for counter sales. Also need amateur for reconditioning of communication receivers and xmts for one of the largest Amateur Radio Distributors in the Midwest.

Box 117 QST



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Courses ranging in length from 7 to 12 months. Dormitory room and board on campus for \$48.00 a month. The college owns KPAC, 5 KW broadcast station with studios located on campus. New students accepted monthly. If interested in radio training necessary to pass F.C.C. examinations for first-class telephone and second-class telegraph licenses, write for details.

PORT ARTHUR COLLEGE **PORT ARTHUR TEXAS**

Approved for G. I. training

RAYTHEON

. . . We are taking up your suggestions with our Engineering Department, and you shall hear further from us.

— H. C. Matthea,
Exec. Vice President

RCA

. . . It is the desire of the Radio Corporation of America to cooperate with any organization whose objective is to improve radio and television service to the public.

I appreciate very much your recognition of RCA's leadership in recognizing the problem of television interference. I can assure you that we will continue to take the same attitude that we have in the past and to consider all the designs from the standpoint of the problem which you have pointed up.

— C. B. Jolliffe,
Vice-President and
Technical Director

WELLS-GARDNER

I was very happy to receive your letter regarding interference in the television field, and I believe that it is very commendable that your organization is taking an active part in helping keep the industry out of trouble on these matters.

I am referring your correspondence to Gordon T. Bennett, our Chief Engineer, who will contact you direct should any assistance be required.

— Robert S. Alexander,
President

Temporary and Semi-Permanent Antennas

(Continued from page 41)

In some cases a thimble cannot be used, especially if the line makes a sharp bend over a narrow crotch, since the change of diameter may be too great to permit the line to pass even with Scotch tape over the joint.

The range of conditions under which success may be achieved with care is rather wide. One type of condition is that where a tall tree is surrounded by a number of other trees. An arrow placed over a desired portion of this tree may fall far beyond, pulling the line over several trees. It is possible, with care, to withdraw the arrow to a position where it falls below the desired branch, bringing the line down with it. This feat may be accomplished, after the arrow has been allowed to touch the ground, by wrapping its tail assembly with some more Scotch tape, continuing the wrap back to the end and making a smooth joint between the line and the rear of the arrow. Now it is possible to withdraw the arrow without its snagging on the way up. In withdrawing the line, a sudden change of tension is felt when the arrow has been drawn through the top of one tree and falls alongside the next. When the arrow has fallen alongside the correct tree the line may be released so that the arrow falls to the ground. It is now possible to splice the next heavier line to the initial line and proceed with the job.

Another interesting situation is that requiring a very-high-angle shot, such as when erecting a vertical antenna in a grove of trees. Under some conditions, this is the only kind it is feasible to erect. A high crotch to which there is a clear

(Continued on page 116)



UNCLE DAVE'S BARGAIN CORNER

50 Watt sockets similar to National XM50 @ 2 for \$1.50. Each.....	\$.79
15 mmfd air trimmer cond. similar to National PSR. Each.....	.35
25 mmfd air trimmer cond. similar to National PSR 25. Each.....	.40
100 mmfd air trimmer cond. similar to National PSR100. Each.....	.95
10 mfd 600 V oil condensers. Each.....	2.25
15 mfd 1000 V oil condensers. Each.....	5.95
3 gang ceramic rotary switches, 2 circuit 5 position. Each gang.....	.95
1 gang bakelite wafer switches, 4 circuit 3 position. Each.....	.35
1 gang bakelite wafer switches, 1 circuit 4 position. Each.....	.35
72 ohm antenna lead-in wire 1 kw rating clear polyethylene similar to Belden 8210. Per ft., Per C.....	.09 5.00
3" Bakelite Black knobs flange type with pointer—similar to ICA 1172. Each.....	.30
10 for.....	1.50
4" Black bakelite dials 0-100. Each.....	.30
10 for.....	1.50
Penn Boiler Thriftower No. 30 20 ft. tower c/10 ft. pole.....	28.60
Penn Boiler Thriftower No. 10 20 ft. tower c/20 ft. pole.....	33.30
2 Industrial Instrument decade boxes Model DR14 total resis. 9000 ohm 1% accuracy in steps 9 x 1000. Each.....	17.00
1 Industrial Instrument Model DK2A Capacitance decade box all mica cond. 1% accuracy .2% P.F. total capacity 1.11 mfd in .001 steps.....	70.00
1% accuracy total resistance 999000 ohm in 9 x 1000, 10000, 100000 ohm steps.....	37.50

Calling All Hams!

Johnson Viking Transmitter Kit.....	\$209.50
Wired and tested, less tubes, crystal or mike.....	259.50
National HRO-50T1 less speaker.....	383.50
Speaker.....	16.00
National NC-183-T less speaker.....	279.00
Speaker.....	16.00
National NC-125T less speaker.....	149.50
Speaker.....	11.00
Hallicrafters S-38B.....	49.50
Hallicrafters S-40B.....	99.95
Hallicrafters S-53A.....	79.95
Hallicrafters S-72.....	109.95
Hallicrafters S-72L.....	119.95
Hallicrafters S-76.....	169.50
Hallicrafters S-77.....	99.95
Hallicrafters S-80.....	44.50
Hallicrafters S-81.....	49.50
Hallicrafters S-82.....	49.50
Hallicrafters SX-62.....	289.50
Hallicrafters SX-71.....	199.50
Hallicrafters R-46 speaker for SX71-SX62 and S-76.....	19.95

WE ALSO CARRY FULL LINE ON SONAR EQUIPMENT, MASTER MOUNT ANTENNAE, BUD, BARKER & WILLIAMSON, ELDICO, LYSCO, HARVEY-WELLS, PAR-METAL, MILLEN, NATIONAL, E. F. JOHNSON, AND MANY OTHERS. PHONE AND MAIL ORDERS ARE SOLICITED AND EXPERTLY HANDLED. YOUR INQUIRIES ARE WELCOME.

USED EQUIPMENT

National NXT30 transmitter complete with tubes and NTE exciter and NSA speech amplifier 30 watt with coils 10, 20, 40, 80, 160 meter.....	\$125.00
Hallicrafters HT-9 transmitter with coils for 10, 20, 40, 80, 160 meter bands and 11 crystals.....	375.00
Bud VFO-21 variable frequency oscillator.....	42.00
Meissner 150-B transmitter with full set of coils including 10 meter band also exciter and buffer doubler.....	325.00
Hammarlund Super Pro SP-400X complete with power supply and speaker—LIKE NEW.....	300.00
National HRO-5 with power supply, speaker and ABCDEF coils; also is equipped 100 kc calibrator and NBFM adapter—VERY GOOD SHAPE.....	225.00
RME-70 receiver with DB-20 preselector built into one cabinet.....	125.00

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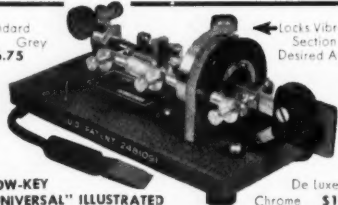
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run is first sighted. Many trial shots may be necessary before correct placement is achieved, because the necessarily awkward body position may cause wavering of the bow.

The antenna itself, if it is to stand more than a few days, should be mounted with a spring in one of the supporting lines to counteract the changing tension caused by the swaying of the trees in a high wind and by the ropes getting wet in storms. A pulley and rope with a counterweight is even better than the spring, since it affords a constant pull and can accommodate itself to large changes in the distance spanned by the antenna. A bucket of bricks or sand is a simple counterweight; a hook set in concrete is a more elegant one.

The reader is warned to use great care in first learning how to handle a bow with free-flying arrows such as the target arrows commonly available. If he is a novice he will be amazed at the distance which these arrows will fly with the bow only partially drawn. Needless to say, misdirected arrows in a crowded community with small yards constitute a hazard.

World Above

(Continued from page 51)

less than 20 ma. With grid leak values of 3000, 70,000 and 40,000 ohms respectively, in the 6J6 stages, the first tube's plates run at 150 volts and the second at 200. Interwound grid and plate coils are used in preference to capacity coupling, to achieve the most efficient transfer between stages, making it possible to develop 2 ma. grid current in the 832A under load.

OES newcomer W7BYK, Marysville, Wash., reports catching several 50-Mc. band openings during the winter season. W7s DYD KGQ KO and MIG are the old standbys on 6 in that area, and W7FIM has recently rejoined them after a tour of duty in the Army. W7FAW is new on 6 in Seattle, operating on 52.5 Mc. Do they tune the band in Washington?

W9LEE, Westboro, Wis., continues his skeds with W0BBN, 190 miles, successfully on 144 Mc., though there is more frequent rough going in the winter months. Even W9RYN, only 50 miles away, shows considerable fluctuation. W9LEE uses a 6BQ7 crystal-controlled converter to receive W0BBN, who runs 300 watts input. His signal hit deep valleys below readability on about one-third of the skeds in December. Good readable signals were received on 14 days.

W6CFL, Los Angeles, reports completion of a 2400-Mc. cavity that was made entirely by hand, without lathe work of any kind. With ideas taken from a surplus cavity, it features an adjustable choke to allow for maximum output across its tuning range. Tuck's problem is now an accurate means of checking frequency. He would like to correspond with others who are interested in 2400-Mc. experimental work.

YL News

(Continued from page 53)

W1BCU, W1MCW, W1QON, W2WBN, W3OQE, W3PVI, W3UG, W4LAS, W4LKM, W4SGD, W8ATB, W8DJR, and VE3DEX arise at daybreak or before each Thursday to chat on 75' phone. Stimulated by coffee made by their OMs, the gals enjoy reasonably QRM-free rag-chewing at the ghastly hour of 6:30 a.m. EST. . . . Because of ill health, the president of the YLRL New York City Club, W2QWL, has not been active on the air recently. . . . The Ladies Auxiliary of the Rochester Amateur Radio Association has a membership of thirty. The club's five licensed YLs are W2s POT UTE WBN ZRO and WOW (president). . . . With a new bug and transmitter in the shack, W5SON hopes to be on all hands soon.

(Continued on page 118)

Safayette

**your open door
to HAM VALUES
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Scotty Says

Spring is just around the corner, so get ready for that mobile rig with these items. Remember your M-85. See Dec. 1951 QST, page 36, for details. W2LAL



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MOBILE
TRANSMITTERS**
10-11, 20, 75
METER BANDS
All With Tubes

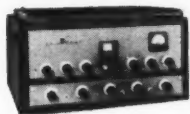
P21208 - Lysco A129T, 10-11 meters. **33.55**
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P21210 - Lysco A175T, 75 meters.

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Circuitwise, either VFO or crystal controlled oscillation starts in an 807 which drives a second 807 while a third 807 is used to screen grid modulate the final. A 6J5 side tone oscillator (which can be altered to a stage of speech) and a 6H6 antenna current indicator rectifier complete the tube line up. This rig is powered by a 12 volt motor generator producing 500 V at 200 ma. Relays perform the function of remote starting while a meter and associated switch enable accurate knowledge of tune-up and operation.

You would normally pay almost \$40.00 for the dynamotor itself. You can buy the complete AT-1 with instructions for but \$36.

THE OVERBROOK COMPANY
Overbrook 81 Massachusetts

... W6KXT (formerly W5PTI) is expecting an OA4 call. ... G3GOX is a new YLRL member from G-land. ... With five jr. ops about, WSHLE concludes that evening operation is most comfortable. Arlie works 75 and 10 'phone and 40 c.w. ... W7NWT, W7QGF, W7PTC, and Betty Lee Gorton, who is awaiting her call, are active



in the newly-organized Lake Washington Amateur Radio Club of Washington. ... *Harmonics* editor WIRTB is expecting her first jr. op. in June. ... Fifty Japanese orphans enjoyed Christmas thanks to the efforts of the Los Angeles YLRC and the U. S. Marines. During a traffic sked with JA2MB and JA2HB, W6UHA learned of the children's sad plight. The L. A. YLRC unofficially adopted the boys, raised funds, and sent huge boxes of clothing and presents. On Christmas Day the Marines helped St. Nick distribute the gifts by helicopter. An account of the event was later broadcast by the Voice of America as an example of generous American spirit.

YLRL Growth

YLRL Secy.-Treas. Peg Wells, W1BCU, reports that a check of YLRL records for 1951 reveals the following:

Members in good standing for the year totaled 376. Forty members reside outside of the United States or its possessions. The Sixth District claimed the biggest membership with a total of 53 YLs. The Second District ranked second with 42 YLs.

Indications are for the greatest membership ever in '52. Have you paid your dues for the new year? Send \$1.00 to W1BCU at 343 Fisher Street, Walpole, Mass. YLRL invites licensed YLs the world over to become members.

Single Sideband

(Continued from page 57)

lows like W2SHN and W9OHM for the technical help and the glad hand given to a newcomer. We're sure he is speaking for many more when he says that — if there is one place in ham radio where you can receive a warm welcome and all the help you need — it is among the s.s.b. gang.

Although W5FNA hasn't succumbed yet himself, he is proud to let us know that W5MIL is the first s.s.b. station on in San Antonio, operating both 20 and 75. Come to think of it, where is all the Texas representation? Just to start a small war, we hasten to point out that *California* is well represented, with W6s BAY EDD EDJ FIR GGM IMZ KNH LRQ UOC/mobile VSF WI ZQZ and W1JEO/6 all active on 75, according to GGM at Santa Cruz. BAY EDD GGM and KNH are using the Signal Slicer (*GE Ham News*, July, 1951) with excellent results. They like it because it is useful with c.w., a.m., n.f.m. or s.s.b. A couple of them have made the local oscillator crystal-controlled, which should make it even better.

W6FIR is ex-W1TKY, and he uses a voice-controlled W1JEO exciter followed by an AB1

(Continued on page 120)



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Model 9D Dynamic.....List price **\$28.50**

Model 9X Crystal.....List price **\$23.50**

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Toronto, Ontario and branches.

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New York 4, New York

Model 9D
Dynamic



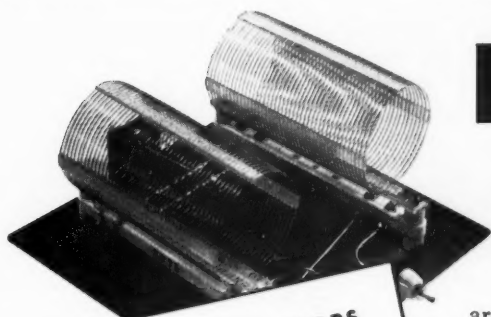
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829-B driving Class B 813s. . . . W6KNH has just completed a new exciter that has the works: crystal-lattice filter, voice control, carrier reinserter, and bandswitching to 75, 20 or 10. . . . W7AVE has been on with low power, but didn't have much luck finding CAL, LWB, KSS and the other W7s, probably because he was crystal-controlled around the low end of 75.

Here is a very nice summary of the VE3 gang, sent in by VE3ABF: AAL, ADB, ATP and EI use 10-ke. filter jobs; ABF, HF and QG use W1JEO crystal filters; ATI and YE use lattice crystal filters. ATI, QG and YE use 811s in the final; HF uses a pair of 810s, and ABF has a 304. These fellows hang out around 3780, with occasional excursions to 3995 for W contacts.

Across the pond, we hear from G3FHL that the s.s.b. gang put on a good show at the RSGB Exhibition in London, where they demonstrated the rigs of G3s BVA CU FDG CWC and FHL. The selectable-sideband receiver of G2IG was also on hand. They feel that they accomplished quite a bit in the way of familiarizing the G gang with s.s.b. techniques and with the tuning procedure when using an ordinary receiver. A number of visitors admitted that they were very surprised to find "how easy it was," and one heckler sent along his young daughter to ask the demonstrators, "What's the good of transmitting s.s.b. if no one can read you?" That sounds just like this side of the water!

DLIKV was kind enough to send along four issues of *Dus DL-QTC* (Sept.-Dec.) that contain the series of articles he and DL3GL have written on s.s.b. If you are a collector of s.s.b. literature you will want these, since one issue has the most complete bibliography of practical s.s.b. articles that we have ever seen.

We would like to put more practical hints and kinks on s.s.b. in this column, so if you have run across any tricks that might help someone else to get his rig running or running better, please pass them along. We can get the space if we can get the material. — B. G.

Correspondence

(Continued from page 61)

here use stacked Yagi antennas 50 feet high, if you see what I mean.

— Arthur B. Hale, jr., W4AWS

"SS"

10 Clark Street
Glen Ridge, N. J.

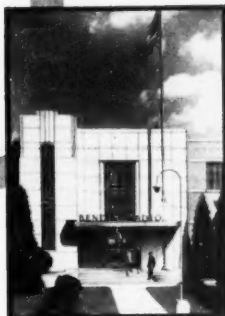
Editor, QST:

I have become so thoroughly disgusted with these "CQ 88" week ends of late that I have almost given up amateur radio after about 47 years at the key.

The "ham" bands, especially 40, are cluttered up with a lot of rotten-fisted "CQ 88ers" who don't know how to use a bug in the first place and one can hardly understand their call letters. I for one am shunning contests forever.

I am not the only one who is disgusted with these affairs as many of my amateur buddies likewise do not go in for this trashy business of cluttering up all amateur channels

(Continued on page 122)



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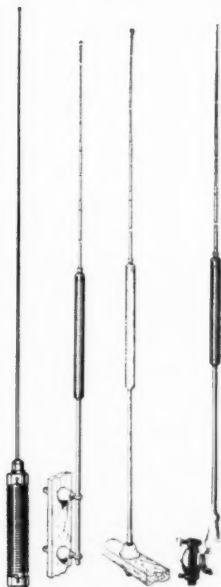
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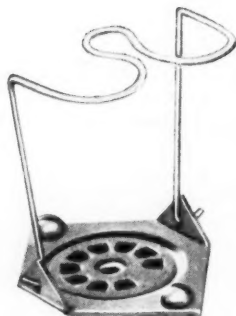
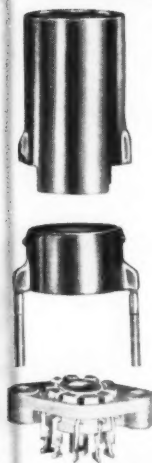
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National



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with nonsense. It has become so bad that one cannot get any enjoyment out of ham radio. . . .

— Albert Edwin Sonn, W2GC

208 So. Main St.
Swanton, Ohio

Editor, QST:

Have just completed making out my Sweepstakes summary sheets and want you to know that of all the contests that you sponsor the Sweepstakes is by far the best one for low power and limited equipment.

It is the one contest where there is plenty of activity, lots of stations to contact and best of all, unlike the big DX contest, the competition is more equally spread out. This gives the low-power gang a chance to work lots of new districts and states. . . .

— Alfred Vasko, W8FRD

160-25 Baisley Blvd.
Jamaica, N. Y.

Editor, QST:

Don't know when I've enjoyed myself as much as during the 18th SS! . . .

— Don Miller, W2MQB

4801 Stuart Ave.
Richmond, Va.

Editor, QST:

. . . . I am completely disgusted and burned to a crisp after trying to get a little traffic off this past week end, it being the first week end of the rat race called Sweepstakes.

Now I realize that a lot of guys get a kick out of these activities and I am not downing them for it, but it seems like that they could show a little respect for the few fellows that are interested in handling traffic, especially from overseas, and trying in our own way to justify our very existence. When a regular member of a traffic net cannot take a minute out from swapping numbers with another section to deliver a message to a GI's family, I think it is time to get mad. One station that I know of had about twenty messages and could not get a station to relay any of them. I am sure that there were others like myself, with low power, that could not plow through the CQ SSs from the kilowatts to handle it. I have operated contests and I would like to know in what way they increase the operating ability or the efficiency of the equipment. . . .

— W. E. Sampson, jr., W4NAD

HAM SPIRIT EXEMPLIFIED

5202 Haspel St.
Elmhurst, L. I., N. Y.

Editor, QST:

Recently I placed an ad in QST for a local ham operator to help me with code and theory.

The response was unbelievable. The letters, 'phone calls and post cards came pouring in from OMs, YLs, regular ops, Novice Ops and fellows that are in the same boat I am.

You may be interested to hear that one letter was received from as far south as Richmond, Va., suggesting that I get in touch with a local ham that is in my vicinity just one town away.

For anyone trying for the Novice or any class license, I certainly recommend that an ad of this kind be placed in QST. I feel sure that if he receives half the response I did, he will be on the air much sooner and with many new friends.

— David M. Turner

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United Air Lines has openings for line radio mechanics at New York, Chicago, Denver, San Francisco, Los Angeles and Seattle. Also have openings for Radio Shop Mechanics at our modern maintenance base in San Francisco. Must have second class radio-telephone license. Attractive starting salary with periodic increases. Applicants may apply by writing:

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Hangar No. 5, Stapleton Airfield, Denver 7, Colo.



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SWAP: 5 x 7 Elwood enlarger, F 4.5 6" anastigmat for ham receiver or TBS-50. James Cotten, Weatherford, Texas.

IRE Proceedings 1950 and 1951 for sale, \$20. W2EC, 169 Buckingham Road, West Hempstead, L. I., N. Y.

WANTED to get on bands, late A-1 32V2 and instructions with fans and filters, or without. Also late SX-28 and speaker in A-1 condition. State lowest price. Walter A. Travis, W8VXV, Box 3811 Collinwood Station, Cleveland 10, Ohio.

FOR Sale: Mallory Vibrapak, 6VDC to 100 v 120 ml., \$15. Meissner signal shifter, \$25; five 4X500F, \$40 each, three new \$29, \$60 each, four new \$72, \$3 each. L. A. Benson, 7518 Cromwell, Clayton, Mo.

FOR Sale: S-40-A receiver, in good condition, currently used on ten. \$65.00. Want: HQ-129X, SX-21, etc. Make offer for trade. W2ABT, 34 West Girard, Kenmore, N. Y.

WANT to reduce mystification to one transmitter and one receiver. Have several transmitters, receivers, converters, VFOs, test and ham equipment for sale. John Leeder, W0UFD, 1123 So. 50th St., Omaha, Nebraska.

SELL: Eddico TR-75 TV1 proof transmitter recently built, used very little, and works fine. Also 1/4 H.P. electric motor, 2 plate transformers, 500-0-500, at 200 mils and several small power transformers, one 40 meter ARC-5 receiver with power supply, and these tubes: (8) 807s, (2) 604Ts, (4) 1626s, (4) 1629s. Will sell separately or \$100 takes it all. All inquiries will be answered. Send your reply to James D. Lehman, W4POL, Parkview Box 52-B, Harrisonburg, Virginia.

FOR Sale: Two power supplies, 115 v, 60 cycle, with standard rack panels (19"). 450 VDC, @ 350 A. The other, 900 VDC @ 200 A. Quality components throughout. \$15.00 and \$25.00. F.O.B. Lexington, James W. Craig, Jr., 352 Henry Clay Blvd., Lexington 5, Kentucky.

SELL: ATD phone-c-w. xmitter, like new; 814 final; crystal, VFO; 4 channels, remote-control; 24v dynamotor; AC conversion easy; \$75.00. Consider Swap for combination phone-pa outfit or mobile xmitter, converter. W8HJHC, 408 Nancy St., Charleston, W. Va. GE VRS-1. Best offer or good trade recorder. W4SDU, 1825 Cherokee, Owensboro, Ky.

FOR Sale: S-38B, excellent condition, \$15. J. Thompson, 428 Storrs St., S.E., Grand Rapids, Michigan.

SELL: 829B tubes, \$7.00 each; 30 watt mod. transformer UTC, S-19 \$5.00; Electro-Voice, #210 carbon mobile mike \$8.00; Simpson 2" rectangular illuminated 200 Ma. meter, new, \$5.00. Dick Rice, W0LDC, 816 W. Main, Champaign, Ill.

SELL: National NT-57 receiver, excellent condition. Make an offer. John Salvager, W8RMI, 1, Kirkland B-41, Harvard College, Cambridge, Mass.

FOR Sale: Practically new S-40 receiver. Used less than twenty hours. \$60.00. W5VFE, Wilenzick, 1608 Fairview Ave., Monroe, La.

SELL: Collins 30 K-1 xmitter with 310A driver. Must sell because of illness and moving to smaller shack. Also have Sonar MB-611 and new Harvey-Wells Aircraft xmitter AT-3B-12 with supply. Easily converted to 75 meters. Jack Rose, W8BQF.

SELL or swap: New York City vicinity preferred: 400 watt phone-c-w. xmitter, PP 810s, 7" steel cabinet, 5 per supplies, 6 meters, relays, etc. \$250; 2 new 4E27s, \$25; 6 W.E. rack, \$8.00; pair new BC-222s less tubes and handsets, \$20; 3 German field telephones, \$30; SX-11 super Skydrider receiver, less tax, \$45.00; HT-17 transmitter, \$50; E120 signal generator, used \$29.00 and socket, make offers. All are F.O.B. Want: mobile equipment: Collins 32V2, 75A2, 8 mm camera and projector. W2KQA, Kineldorf, 936 Chancellor Ave., Irvington, N. Y.

FOR Sale: Hallcrafters S-76, new, used about 25 hours. First \$135 or best offer takes it. Reason: College. Box 1155, Stanford University, Stanford, Calif.

WANTED: Panadapter, Sandy Pierson, W21JG, R.F.D. 2, Newburgh, N. Y.

FOR Sale: Milen 90700 VFO, \$20.00. Rice "Var-arm" VFO, \$10.00. BD-77C Dynamotor, \$8.00; BC-610 modulator deck, \$20.00. All F.O.B. Scotia, N. Y. Send for description 5-in. oscilloscope, SC-522. List of new panel instruments. Large stock xmitting components. Write your needs. Stratton, W2RTM, 443 Saratoga Rd., Scotia 2, N. Y.

FOR Sale: Collins 10-B-3 xmitter, like new. Best offer over \$215. F.O.B. Reason: Purchasing larger xmitter. Bob Kerl, W0FNV, 1803 Linda Lane, Falls Church, Va.

WANTED: Ham receiver. State price and description. Write to Box 206, Roxbury, New York.

COMPLETE 200-watt phone, \$55.00; 175 issues of QST, Radio News, etc. \$10. New Sylvania tubes, 70% off. Precision tube-tester; 4-tough-Bronze condenser tester. W2ARA, A. Adamo, 236 Landis Ave., Vineland, N. J.

SELL: National NC-183 with speaker and National NBFM adaptor, \$250. Also Johnson Viking with all tubes and seven Biley crystals, \$210. Both guaranteed good as new. A-1 condition in and out. Used about ten hours. W0WVY, Box 122, Westboro, North Dakota.

FOR Sale: BC-221 calibration book and crystal. Q2NQW, Keeler, 46 Seward Ave., Port Jervis, New York.

TRADE new black crackle BC-459 transmitter 7-9.1 Mcg. less tax for 9" x 9" W9GMV, Hubbard, 2217 Ogden Ave., Superior, Wis.

WANTED: Good, clean, used communications receiver, reasonable. W4PPI, 1208 Shakerfield Rd., Nashville 12, Tenn.

COLLINS 10-B-1, \$200 F.O.B. Norman Ray, Rt. 3, Box 481, Bothell, Washington.

SELL: VFO frequency meter, consisting of BC-221-AK followed by 6AG7 and 6V6, 40 mhz output, integral power supply, rack mounting on 8 1/2 x 19" panel, calibration book, a beautiful box, \$95.00. Stancor P-8032 power transformer, 2000 1750 vdc 350 Ma., \$15.00; Super Pro SP-210 X, 1250 Kc to 40 Mc., power supply, factory overhauled, like new, \$190.00. Lee, W4RNO, Box 116, Isle of Palms, S. C.

BC-610E good condition, converted to 10. All coils extra 250TH, \$500. W8BPN, 1802 Berkeley, Cincinnati 37, Ohio.

MOTOR, used, Westinghouse, three-phase, 1/2 HP, 220V or 440V, 60 cycle, 1725 RPM, style KL-955-60C, husky job, fine condition, \$20.00. F.O.B. WIGXJ.

SELL: Near-new Milen 90800 Exciter, 10, 20, 40 coils, tubes, \$29.50. W0TDH.

WANT dual 10 uF condenser, Bud BC-1633A, and National multi-hand assembly MB40L. G. Black, 1546 Spruce St., Berkeley, Calif.

WANT pair of 4-250As, few 110 VAC relays, sell three 250TH, never used. KP4UC, Box 781, Arcadio, P.R.

BOSTON or vicinity. For sale: Meissner 150B xmitter, exciter unit and buffer for 10-meter operation. All completely shielded. TV1 coils for 80, 20, and 10. High gain stage for xtal mike. Reason: have no time. First \$250 takes it. W4HGT, Paul Simeone, 13 Stratford Road, Andover, Mass. Tel. 1319.

INSTRUCTOGRAPH AC operated with 12 tapes, needs only key and headphones. \$25. L. L. Chilton, Jr., W5NT11, 3412 Whittier St., Ft. Worth, Texas.

WANTED: ART-13, TCS, SCR 284A, RC-34, BC-654A, and their dynamotors, cables, parts, BC-221, BC-34B, BC-312, BC-342. Test equipment, manuals, cash or trade. Arrow Appliance, 525 Union, Lynn, Mass.

WILL buy all ART-14, 147A, \$220.00; ART-13, 147, \$150.00; BC-348 (not B or C) \$65.00; ARC-3 complete, \$750.00; R77 receivers only, \$400.00; BC-312s, \$65.00; BC-342s, \$60.00; ARC-1s, \$600.00. Ship via express C.O.D. "subject to inspection" to H. Finnegan, 49-57 Washington Ave., Little Ferry, New Jersey.

MEISSNER signal calibrator 10-50-100 Kc, Model 9-1006, \$29.50. DB-22A Pre-selector, \$59.50. VHF-152, 2-6-10 meters, \$69.50. All units like new. Color: olive grey. W0CVU, P.O. Box 224, Cedar Rapids, Iowa.

WANTED tape-recorder, buy or trade. Tanenbaum, W2AQ, 1515 East 8th St., Brooklyn 30, N. Y.

WANTED: Wireless specialty triode "A"; Triode "E", highband key, any DeForest apparatus, any Marconi apparatus, Collins "Wireless Telegraphy". Wireless Age, OS is before 1921, amateur apparatus before 1921. Please describe all items fully and give asking price. L. Rizoli, W1AAT, 100 Bay View, Salem, Mass.

NEW crystals for all commercial services at economical prices; also regrounding or replacement crystals for Broadcast, Link, Motorola, G-E and other commercial types. Over 16 years of satisfaction and fast service! Edson Electronic Company, Temple, Texas. Phone 3-3901.

SELL: SP400X complete with Power supply and speaker, perfect condition, \$250. W8MCR, Milburn, W. Va.

BARGAINS: extra special Motorola P-69-13 mobile receivers, \$29.50; Globe King, \$115.00; HT-9 \$199.00; HRO-50, \$299.00; 600, \$109.00; AP400X, \$249.00; SP400XS, \$199.00; HRO-7, \$199.00; Collins 75A1, \$295.00; HRO-5T, \$175.00; SX-71, \$159.00; RME 2-11, \$99.50; RME-45, \$99.00; Meissner SX shifter, \$59.50; S-40A, \$69.50; VHR 152A, \$69.00; HR-10-20, \$150.00; SX-24, \$69.00; Globe Trotter, \$79.50; Meissner Signal Calibrator, \$24.95; MB611 mobile transmitter, \$29.00; 9080B exciter, \$29.50; XL-10, \$14.95, and many others. Large stock of trade-ins free trial. Terms financed by Leo. W0GFO. Write for catalog and best deal to World Radio Laboratories, 74-44 West Broadway, Council Bluffs, Iowa.

RADIO officers, \$7,200-\$10,000 annual earnings, top union conditions, 6 months radio operating experience. U. S. merchant ship on FCC License since January, 1935, can get emergency FCC License to sail at once. Also experienced USN radiomen with 2d class radiotelegraph license and 6 months sea radio time. Phone, wire or wire American Radio Association, C/O, 5 Beekman St., New York. CO 7-6397.

1 HQ-129X, \$145.00; 1 HF 152A, \$50.00; 1 BC-451B, \$17.50; 2 Gonset 10-11 converters, \$25.00 each, 1 Stancor 10 meter mobile transmitter, \$45.00. J. H. Garrettson, 1600 W. 5th St., Brooklyn 4, N. Y.

TRADE: LJ frequency meter, 2 to 30 Mc. Complete with Instruction Book and crystals. Want H.V. power supply or good equipment. F. Cecchi, 218 Burrell St., Blairsville, Penna.

SELL: ART-13, also Thordarson 500 watt multimatch modulation new, boxed; PP 813 final, all bands, plug-in coils VAC cond; dozen 8005, new; pair 904TH, new; pair 250TH, Cardwell 40-40 1/2 in. spacing, much high power gear, meters, Charles Ham, W2KDC, 200 Harvard, Westbury, N. Y.

NOVICES: 60-watt Milen C-w. xmitter, complete with 600 volt power supply, 2 xtals and 2 coils for both 80 and 11 meters. Best offer over 60 dollars. W2KNZ, Flemington, N. J.

WANTED: couple of APR4 or APR5 receiving units. W1HFE, 11 North Grant, Waynesboro, Penna.

FOR Sale: 32V2 Collins transmitter, used about 25 hours. Will sell to best offer. W1W0X, 413 Audrey Lane, S.E., Washington 20, D. C.

WANTED: RG-8U, RG-11-U, or RG-59 U coaxial cable, any lengths, any quantities. Write: Television Service Co., 249 North 48th St., Lincoln, Nebraska.

SELL: Complete station, Johnson Viking, six months old, factory wired, factory de-TV'd, 4D32 final. Extra set tubes including 4D32, Eddico Low Pass, New Viking VFO, New D-104, push to talk. William S. Haddon, W7DKA, Box 190, Ogden, Utah.

BARGAINS: New and reconditioned Collins, National, Hallcrafters, Hammarlund, RME, Milen, Gonset, etc. Recycled: \$8.8 \$29.00, S40A \$69.00, SX41 \$119.00, SX71 \$149.00, SX42 \$199.00, HT18 \$79.00, NC \$59.00, NC 171 \$139.00, NC183 \$199.00, HRO50 \$279.00, HRO51 \$319.00, HRO29S \$199.00, HF10-20 VHF152A, RME45, SX25, S72, SX28A, SX62, S36, HRO, SP400X Super Pro, Collins 75A1, others. Shipped on approval. Terms Write for free list. Henry Radio, Butler, Missouri.

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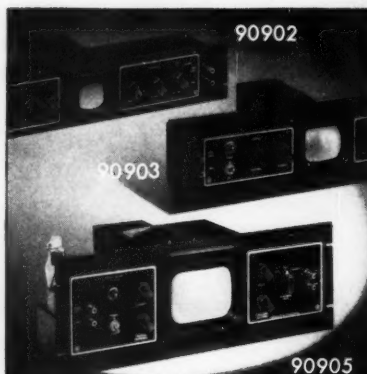
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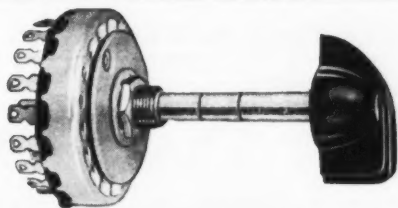
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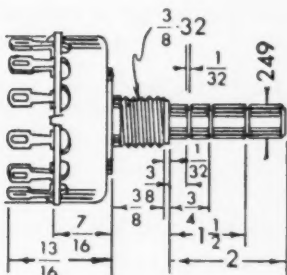
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MALLORY HAM BULLETIN



To solve switch problems around the ham shack . . . in portable test equipment . . . in Civilian Defense gear . . .



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It is probable that most amateurs are familiar with the operation of Mallory 3100-3200 series rotary selector switches when used in antenna changeover circuits of the type commonly employed in converters, signal boosters, and RF pre-amplifiers. However, it is doubtful that very many amateurs are fully aware of the extent to which these compact switches can be used around the ham shack to solve other switching problems.

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For your information, the Mallory 3100-3200 switch is made in 12 circuit combinations, in either shorting or non-shorting styles. Switches of 12 positions or less (30° indexing) are 1 1/4" in diameter; all others are 1 1/2" in diameter, have up to 17 positions depending upon the number of circuits, and feature an adjustable stop mechanism. Bushings are standard 3/8" in diameter and have a #32 thread. Shafts are 3/4" x 2", and are pre-grounded at popular lengths to permit accurate cutting. An attractive molded knob is supplied with every switch.

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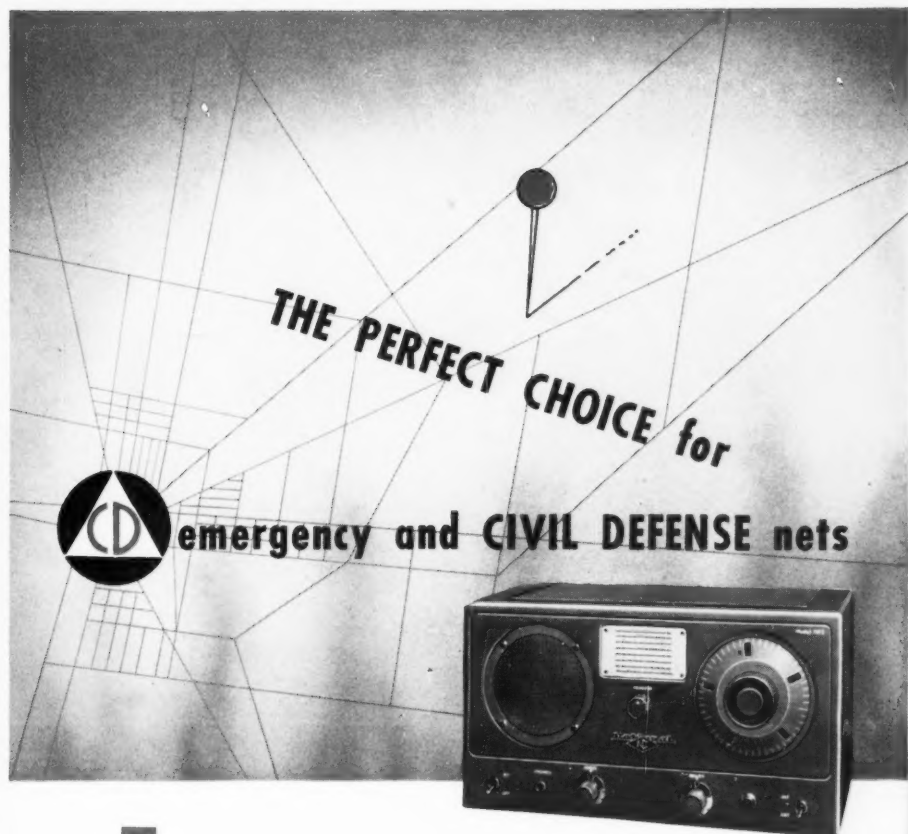
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